



CENTRE
FOR HEALTH AND
POPULATION RESEARCH



1996

**ANNUAL
REPORT**

A&P	Administration & Personnel (Division)	IPH	Institute of Public Health
ADB	Asian Development Bank	IPHN	Institute of Public Health Nutrition
AEEC	Animal Experimentation Ethics Committee	IT	Information Technology
AIT	Asian Institute of Technology	IV	Intravenous
ARI	Acute Respiratory Infections	JDDR	Journal of Diarrhoeal Diseases Research
ALRI	Acute Lower Respiratory Tract Infections	JHU	Johns Hopkins University
AusAID	Australian Agency for International Development	JICA	Japan International Cooperation Agency
BADC	Belgian Administration for Development Cooperation	LSD	Laboratory Sciences Division
BDHS	Bangladesh Demographic and Health Survey	MCH-FP	Maternal and Child Health - Family Planning
BIRDEM	Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine & Metabolic Disorders	MDIP	Meghna-Dhonagoda Irrigation Project
BMA	Bangladesh Medical Association	MH&RC	Matlab Health & Research Centre
BMRC	Bangladesh Medical Research Council	MIS	Management Information System
BRAC	Bangladesh Rural Advancement Committee	MOHFW	Ministry of Health and Family Welfare
CAP	College of American Pathologists	MUAC	Mid-upper Arm Circumference
CARE	Cooperative for American Relief Everywhere	NGO	Non-Governmental Organization
CDCP	Centers for Disease Control and Prevention	NIH	National Institutes of Health
CDP	Community Development Project	NIPORT	National Institute of Population Research and Training
CHF	Child Health Foundation	NIPSOM	National Institute of Preventive and Social Medicine
CHP	Child Health Programme	NORAD	Norwegian Agency for International Development
CSD	Clinical Sciences Division	NRU	Nutrition Rehabilitation Unit
CHW	Community Health Worker	ODA	Overseas Development Administration
CSW	Commercial Sex Worker	ORS	Oral Rehydration Solution
CI	Collaborating Investigator	ORT	Oral Rehydration Therapy
CIDA	Canadian International Development Agency	OSEPP	Occupational Safety & Environmental Protection Programme
CIS	Computer Information Services	PCC	Programme Coordination Committee
COTC	Community-Operated Treatment Centre	PCR	Polymerase chain reaction
CRSC	Clinical Research and Service Centre	PHLS	Public Health Laboratory Service
CWFP	Concerned Women for Family Planning	PI	Principal Investigator
DANIDA	Danish International Development Agency	PSC	Population Studies Centre
DCC	Dhaka City Corporation	PHSD	Public Health Sciences Division
DISC	Dissemination and Information Services Centre	RISC	Research Initiative on Safe Motherhood and Child Survival
DSS	Demographic Surveillance System	RKS	Record-keeping System
DTC	Diarrhoea Treatment Centre	RRC	Research Review Committee
ECPP	Epidemic Control Preparedness Programme	RTIs	Reproductive tract infections
EHP	Environmental Health Programme	SAARC	South Asian Association for Regional Cooperation
ELISA	Enzyme-linked immunosorbent assay	SAFE	Sanitation and Family Education
EOC	Emergency Obstetric Care	SAREC	Swedish Agency for Research Cooperation with Developing Countries
EPI	Expanded Programme on Immunization	SBSP	Social and Behavioural Sciences Programme
ER&ID	External Relations & Institutional Development	SCFAs	Short-chain Fatty Acids
ERC	Ethical Review Committee	SDC	Swiss Development Cooperation
FWA	Family Welfare Assistant	SDTC	Satellite Diarrhoea Treatment Centre
FWC	Family Welfare Centre	SPSS	Statistical Package for Social Scientists
FWV	Family Welfare Visitor	SRCS	Swiss Red Cross Societies
GARNET	Global Applied Research Network	STDs	Sexually Transmitted Diseases
GB	Grameen Bank	TBA	Traditional birth attendant
GK	Gonoshasthya Kendra	TED	Training & Education Department
GOB	Government of Bangladesh	UHEP	Urban Health Extension Project
HPED	Health & Population Extension Division	UNDP	United Nations Development Programme
HKI	Helen Keller International	UNFPA	United Nations Population Fund
ICDDR,B	International Centre for Diarrhoeal Disease Research, Bangladesh	UNHCR	United Nations High Commission for Refugees
IDRC	International Development Research Centre	UNICEF	United Nations Children's Fund
IEDCR	Institute of Epidemiology, Disease Control and Research	UPS	Urban Panel Survey
IPGMR	Institute of Post Graduate Medicine & Research	USAID	United States Agency for International Development
		USS	Urban Surveillance System
		WHO	World Health Organization

Acronyms & Abbreviations



CENTRE
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MISSION STATEMENT

The fundamental mission of the Centre is to develop and disseminate solutions to major health and population problems facing the world, with emphasis on simple and cost-effective methods of prevention and management.

1996 ANNUAL REPORT



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A typical sight in Matlab, these ubiquitous bridges come in all heights and sizes and are, more often than not the only way to get from one spot to another. Matlab children get used to them soon after they learn how to walk but not many Westerners can set foot on them without understandable trepidation. This painting by Asem Ansari shows one of the bridges that appears more precarious than most – with only the sure-footed insured against an unwelcome, ignominious plunge into the less-than-pristine waters below.

(Cover concept, "1996: Water under the Bridge," by Zahid Iqbal)

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ICDDR,B, the Centre for Health and Population Research, publishes a journal, three newsletters, scientific reports, monographs, working papers, and special publications on subjects relating to diarrhoeal diseases, and population and reproductive health. Details of some of these publications may be found under Publications, p. 111.

Preface

This is the eighteenth Annual Report of the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B). The report documents many aspects of the activities of the Centre during 1996, including research, support for research, health services, training, dissemination, and administration. Abbreviations and acronyms are used freely throughout the report. These are indicated on the inside of the front cover.

Scientific papers, letters, and abstracts published by the Centre's staff, members of the alumni, and by visiting scientists are also listed. Many of these include research work actually done in previous years and documented in earlier reports.

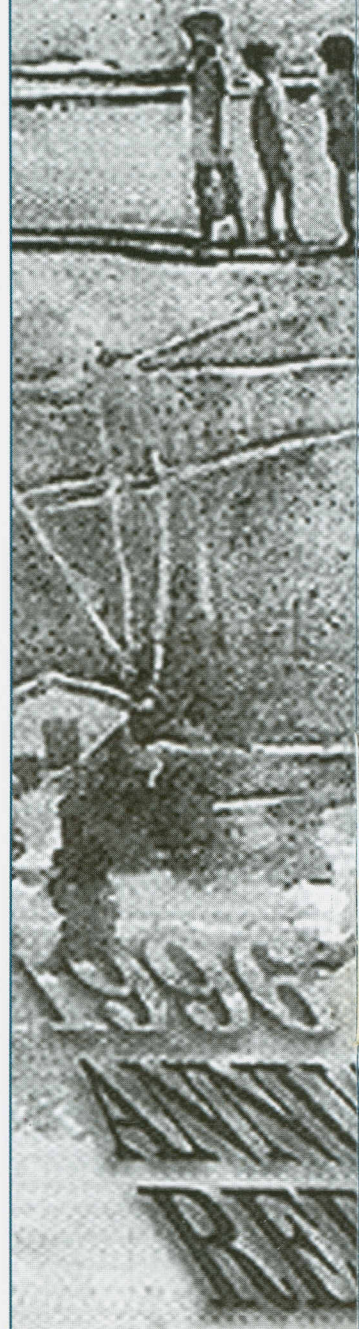
If you have any comments on this report or would like to have more information about the Centre or the works described here, please write to the Centre at the address given on the opposite page.



In a land of rivers, lakes, ponds and canals, Bangladeshi children learn to swim just as soon as they can walk and – just years later – experience the thrill of taking out the family boat, either for a stolen joyride or, more legitimately, to run an errand for “ma” or whoever can be conned into sanctioning the excursion!

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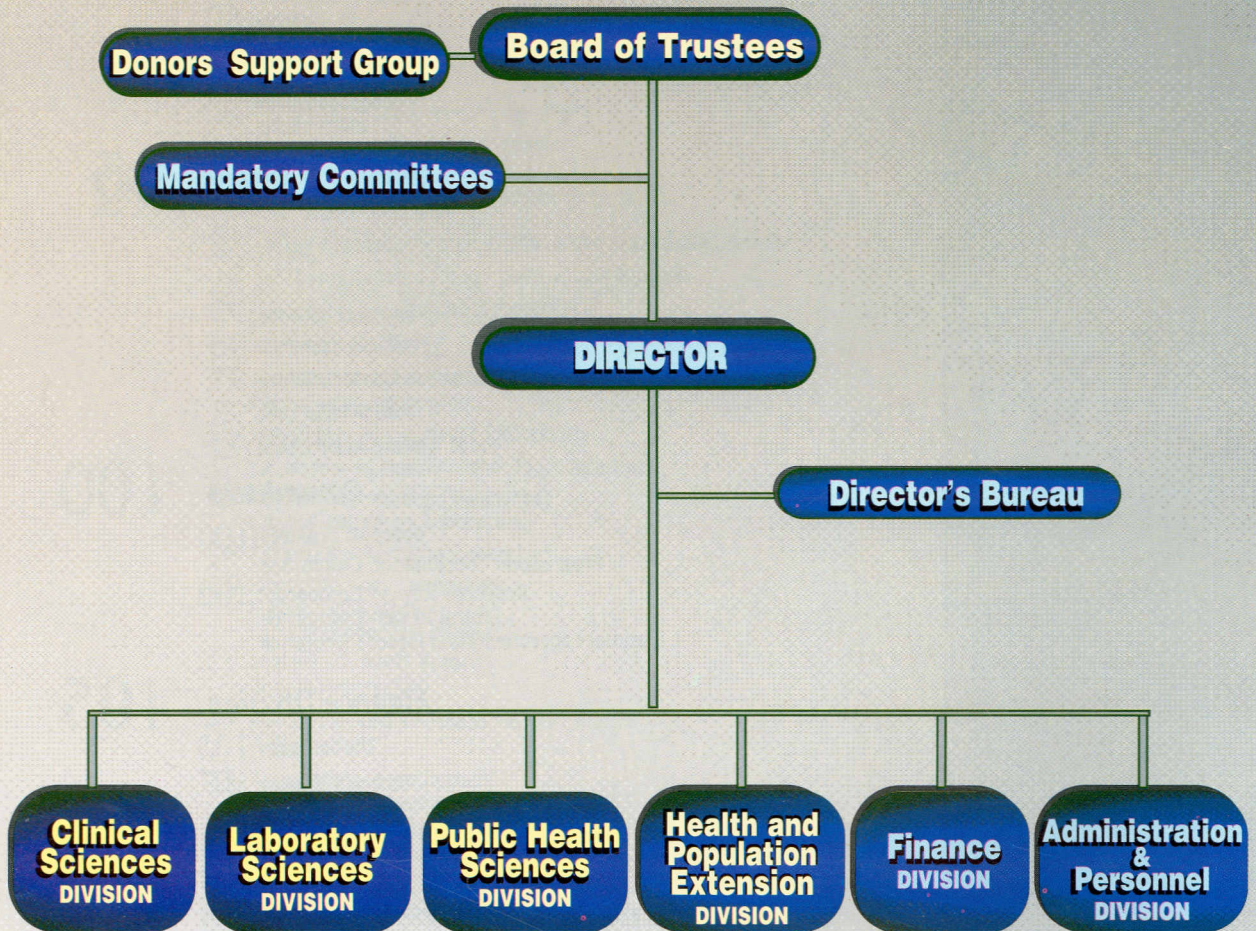
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ICDDR,B

Centre for Health and Population Research



Director's Report

1996 was a peaceful year during which the Centre continued to aggressively pursue its mission to develop and disseminate health and family planning interventions for the betterment of the quality of life for women and children in the developing world. The changes introduced the previous year in the organization and leadership of the scientific divisions contributed to prepare the Centre even better for the task it has set for itself. Nevertheless the Centre continues to reappraise and restructure in order to ensure its survival during the next millennium.

The highlight of the year was the visit on 22 December of the newly installed Prime Minister of Bangladesh, the Honourable Sheikh Hasina. The Prime Minister praised the Centre for its contributions to the people of Bangladesh and said that it is a matter of national pride for Bangladesh that it is host to ICDDR,B, the premier health research institution of the developing world.

The Prime Minister announced an increase in the Government's regular contribution and additionally offered a one-off donation of half a million dollars. Unfortunately, contributions to the Centre from other donor agencies have fallen dramatically and this has been a major pre-occupation of the senior management during this past year.

The declining interest of many donor agencies in development assistance in general, and in health research in particular, is affecting the level and type of support that the Centre is receiving. Efforts to build up the two endowment funds of the Centre - the Centre Fund and the Hospital Endowment Fund - are being pursued with vigour. A dinner held in Baltimore, Maryland USA, in November to launch the Centre Fund campaign enabled the gathering of potential contributors and provided much-needed publicity. The Centre's US office has been successful in obtaining leadership-level gifts from USAID and the Ford Foundation, and is also cultivating the support of other foundations, corporations, and individuals, building linkages with US institutions and identifying and soliciting donors for project support. The campaign for the Hospital Endowment Fund is soon to commence following the completion of preparatory work.

The chronic ill health of the Centre's finances is due in part to the existence of partially or completely unfunded "essential" components of the Centre. These include the hospitals, the Matlab MCH-FP programme - including the internationally unique, 30-year-old Demographic Surveillance System (DSS) - library, training activities, and senior scientific and management staff.

Unless the Centre's income increases, it is clear that some of the "essential" activities of the Centre may have to be sacrificed. Financial headaches notwithstanding, the Centre's staff continue to pursue the research, training, and service functions, many of which are documented in this Report.

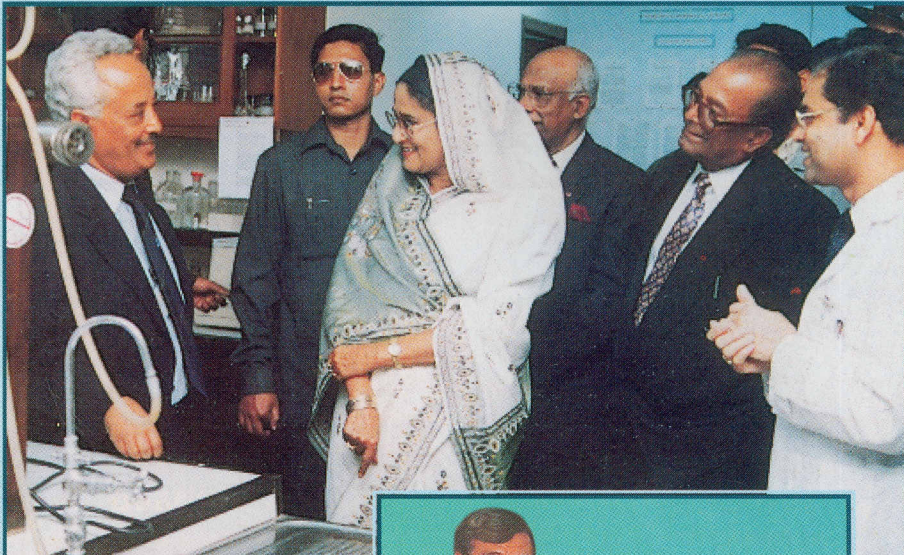
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It was business as usual for the Centre in 1996, marked this year by belt-tightening because of an ebb in funding.

But there was no let-up in the business of saving lives while the usual conferences, seminars and dignitaries' visits continued....

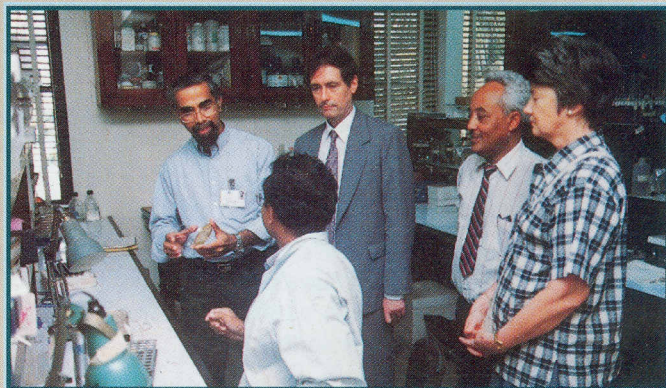
The highlight of the year was the visit to the Centre by the Honourable Prime Minister of Bangladesh, Sheikh Hasina, seen here (right) at one of the Centre's laboratories.

To her left is Mr. Salah Uddin Yusuf, Minister for Health and Family Welfare.



Seen above, H.E. Mr. Yoshikazu Kaneko, the Japanese ambassador, hands over a cheque to Dr. D. Habte, Director of the Centre. Seen to the left, H.E. Mr. David Merrill, US ambassador to Bangladesh, looks on as Dr. P.K. Bardhan (middle) chats with Mr. Charles Weden, Dy. Asst. Administrator, Asia & Near East USAID/W.

Other visiting dignitaries during 1996 were: (left) Mr. Muhammed Ali, Secretary, Ministry of Health & Family Welfare, inquiring about a child at the Centre's Nutrition Rehabilitation Unit. Below, the Australian High Commissioner H.E. Mr. Charles Stuart and Mrs. Stuart visit the Laboratory Sciences Division.



Also seen on the facing page are (top to bottom) : 1. Mr. Albert Mehr, Charge d' Affaires, Embassy of Switzerland, during a visit to a Matlab village. 2. The British High Commissioner H.E. Mr. David C. Walker and Mrs. Walker look on as Dr. Habte coaxes another smile from an infant. 3. H.E. Mr. S.B. Atugoda, High Commissioner of Sri Lanka, hands over his country's increased annual contribution to the Director of the Centre. 4. H.E. Mr. Anders Johnson, Ambassador of Sweden, and Mrs. Johnson tour one of the Centre's wards.



One task that was speedily undertaken was the setting up of an HIV testing laboratory and screening for HIV and Hepatitis B virus of all blood used for transfusions at the Dhaka and Matlab health facilities. Unlinked, anonymous surveillance for HIV on selected population groups has also started.

1996 also saw reviews of several aspects of the Centre's work. An independent review of the Matlab field facility was undertaken which could have far-reaching consequences in the future. The review intimated that Matlab needs to be modernised if it is to remain a centre of excellence for population-based epidemiological and demographic studies over the next decade.

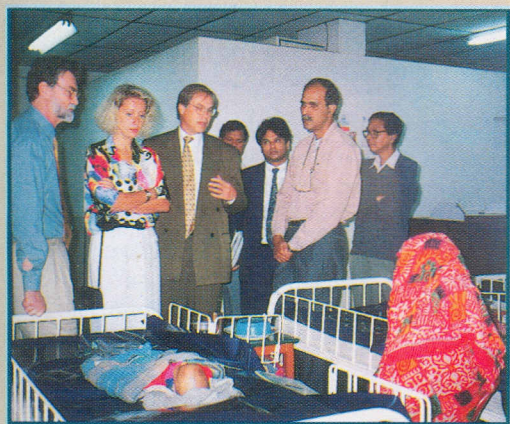
The Laboratory Sciences Division was favourably reviewed in May by an external programme committee. The review commended LSD's remarkable research productivity but called for more focus and coherence in the division's research agenda. In September a 6-member international team of eminent professionals conducted an Integrated Institutional Review of the Centre. This 4-yearly management and programme review is a requirement of the Centre and part of the intensive monitoring and auditing by the Board and the donor community of the Centre's overall performance.

This review was organised and conducted by members of the donor community who set the terms of reference including the issues to be addressed by the review team. The report was presented to the November Board of Trustees meeting and to the Donors' Support Group Meeting. The review was generally positive and made several recommendations to the donor community, the Board of Trustees, and the Centre.

The various scientific working groups developed around themes that transcend division boundaries have been reactivated and are expected to maximise the Centre's research potential in the near future.

Diarrhoea and nutrition remain the focus of research on child survival. The Centre has been engaged in several studies on zinc over the past few years but only recently has it compiled its findings. Zinc supplementation during acute diarrhoea was shown to reduce the rate of persistent diarrhoea and also a modest decrease in the duration of acute diarrhoea episodes. Zinc supplementation of hospitalised children with acute or persistent diarrhoea

Continued on P. 10...



reduced growth-faltering and morbidity during the three months following hospitalisation. The Centre will hold a regional zinc symposium in 1997 to disseminate these findings. The Centre's scientists participated in an international zinc symposium held in Baltimore, Maryland, in November.

Surveillance of *Vibrio cholerae* indicated that a new clone of El Tor has evolved in the wake of the O139 epidemic. While the O139 vibrio has continued to maintain a low profile it has not disappeared and in some parts of Bangladesh has evolved as the predominant vibrio. Meanwhile, clinical trials in adult volunteers showed that the killed bivalent oral cholera vaccine developed in Gothenburg, Sweden, induced immunity and was safe.

Efforts to develop the second generation of family planning services have continued unabated. This has entailed shifting service delivery from the home to fixed health facilities. Management tools have been developed to assist in this and to ensure that coverage does not suffer. Successful interventions at the pilot level are being scaled up to larger population groups in close collaboration with the Ministry of Health and Family Welfare and relevant NGOs.

The Centre's recently completed study on reproductive tract and sexually transmitted infections shows the existence of moderate levels of RTIs and low-to-moderate levels of predominant bacterial, viral and protozoal RTI pathogens. The assessment of the validity of syndromic management flow charts indicates that, in women, the most common presenting syndrome - vaginal discharge - has the lowest predictive value. However, other studies indicate that the charts are probably sensitive and specific for the management of other syndromes, namely genital ulcer disease, inguinal buboes and urethral discharge in men.

Development of a replicable Emergency Obstetric Care (EOC) service to reduce the unacceptably high mortality at childbirth was an important research goal. Such a service was developed for the first time in Mirsarai - where, in June 1996, the delivery of the country's first Caesarean at the Thana level made history for this rural MCH-FP facility. The lessons learned have been accepted as the basis for the Government and NGOs to provide EOC at all Thanas of the country in the near future.

The training endeavours of the Centre continued during 1996 with courses being held involving 512 scientists, physicians, health administrators, health personnel and trainers from 29 countries. Dissemination of the Centre's research findings was pursued through publications and presentations at national and international forums.

The 1996 Annual Scientific Conference (ASCON) was held in February with its theme - "Health and Development: Social and Biomedical Perspectives" - representing the Centre's steadily growing emphasis on health and development as the broader issues of the future.



Demissie Habte, M.D.
Director

The Centre over the years...

Since 1960, the Cholera Research Laboratory (CRL) and its successor, ICDDR,B, has been recognised as the leading international health centre located in a developing country. CRL conducted research that now forms the core of the world's knowledge of diarrhoeal diseases, and led to the development of Oral Rehydration Solution (ORS). CRL was internationalized and became ICDDR,B in 1978 – to become one of the most important and influential health research institutions in the world. The work of CRL/ICDDR,B is often cited as the authority for important health and population-related decisions taken by multilateral, governments and development agencies throughout the world. Indeed, many of the Centre's alumni have become influential policy-makers in these agencies.

Milestones...

1960

The Cholera Research Laboratory is established

1963

The Matlab field station is started and the first of a series of cholera vaccine trials is launched

1966

The Demographic Surveillance System (DSS) is established

1968

The first successful clinical trials of Oral Rehydration Solution are concluded

1969

The relationship between stoppage of breastfeeding and the resumption of menstruation is demonstrated

1971

Bangladesh becomes an independent nation

1973

The shift from Classical to El Tor cholera is identified

1977

Maternal Child Health and Family Planning interventions begin in Matlab

1978

The Government of Bangladesh Ordinance establishing ICDDR,B is signed

1981

The new Dhaka hospital is built and the Urban Volunteer Programme is initiated

1982

Classical cholera returns; field testing of cereal Oral Rehydration Solution begins and the MCH-FP Extension Project starts up

1983

The first issue of the Journal of Diarrhoeal Diseases Research is published

1984

ICDDR,B receives UNICEF's Maurice Pate award

1985

The full Expanded Programme of Immunization activities is tested in Matlab and the WC/BS cholera vaccine trial is launched

1987

ICDDR,B receives USAID's "Science and Technology for Development" award

1988

The treatment of and research on Acute Respiratory Infection (ARI) begins

1989

The Matlab Record-Keeping System is especially adapted for Government use and extended to the national family planning programme

1990

The new Matlab Health and Research Centre opens

1992

The ICDDR,B-Bangladesh Rural Advancement Committee (BRAC) study commences and the new Sasakawa International Training Centre is built

1993

New laboratories are built and equipped and a new *Vibrio cholerae* O139 - Bengal is identified and characterized and work on vaccine development begins

1994

The 25th anniversary of ORS is celebrated; an ICDDR,B cholera epidemic team goes to Goma to assist Rwandan refugees, identifies pathogens, and reduces mortality from as high as 48.7% to < 1%.

1995

Maternal immunization with a pneumococcal polysaccharide vaccine is shown to protect infants up to 22 weeks.

1996

First official visit to the Centre by a Prime Minister of the host country.

Clinical Sciences Division



CSD

Clinical Sciences Division

Division Director
George J. Fuchs

The Clinical Sciences Division (CSD) is one of four research divisions of the Centre. The general aims of CSD include reducing diarrhoeal disease morbidity and mortality by the development of improved methods of clinical management through research and providing care to patients with diarrhoeal disease and related problems of malnutrition and acute respiratory infections (ARIs).

Training of health care providers, both national and international, in case management of diarrhoeal diseases and clinical research is also an important CSD objective.

Division Highlights

- ☐ Zinc was observed to be beneficial in the treatment of acute and persistent diarrhoea and in reducing growth failure and morbidity.
- ☐ Vitamin A (VA) did not reduce the incidence of diarrhoea or ARI, but the duration of ARI was shortened. In a separate study, vitamin A supplementation of women 24 hours after childbirth increased breastmilk retinol, compared to controls, which was maintained for at least six months. The duration of respiratory tract infections (RTIs) was also reduced in their infants.

A significant urinary loss of vitamin A was observed during shigellosis in young children.
- ☐ Serum retinol was transiently and markedly depressed during the acute stage but spontaneously improved without supplemental VA during recovery.
- ☐ Antimicrobial trials continued to result in simplified regimens as well as new treatment options. Hyperimmune bovine colostrum was found to be effective in the treatment of rotavirus diarrhoea, single-dose ciprofloxacin was effective in cholera, and azithromycin was as effective as ciprofloxacin in shigellosis.
- ☐ *Acinetobacter* spp. bacteremia was observed to be associated with 4.7% and *S. pneumoniae* with 1.8% of all hospital deaths and are therefore important and potentially preventable causes of death among patients hospitalised with diarrhoeal disease in Bangladesh. Seventeen percent of pneumococci isolates were resistant to penicillin.
- ☐ A new method to evaluate hydration status was developed utilizing bioelectrical impedance analysis (BIA) and was determined to be an inexpensive, easy, bedside method to assess hydration status more precisely than clinical assessment (WHO guidelines). Studies indicate differences between cholera and non-cholera diarrhoeas in intra- and extra-cellular water compartments.
- ☐ At least one pathogenic *E. coli* was associated with the majority of patients with diarrhoea in 1996. *Aeromonas* was noted to be an important (5.5%) cause of diarrhoea in hospitalised young children.

CSD

The major activities of CSD fall into these three general categories:

- * Clinical and related community research
- * Clinical service (patient care)
- * Training.

To meet Division objectives, CSD operates a hospital in Dhaka, the Clinical Research and Service Centre (CRSC), popularly known as "The Cholera Hospital." A large number of patients with a spectrum of diarrhoeas and associated complications provide unique opportunities for learning and for clinical research.

The majority of CSD studies are performed in the hospital, which has a 15-bed "Clinical Study Ward" and a 12-bed "Metabolic Research Ward" where the more complex protocols are implemented. Studies are also conducted in the "Short Stay Ward" and the "General Ward" of the hospital, and still others in selected field sites within urban/peri-urban Dhaka and in the Animal Resources Branch. In addition to providing care to diarrhoeal patients and nutritional rehabilitation of severely malnourished children, CRSC provides

health education to nearly all patients and their parents or other attendants through its Child Health Programme. The topics emphasised include: prevention and treatment of diarrhoeal diseases, immunisation against EPI diseases, nutrition, psychosocial stimulation of children, and birth-spacing.

CSD also operates a Surveillance Programme in which a 2% sub-sample of patients (every 50th patient) attending CRSC is investigated in detail. The study of the epidemiology of diarrhoeal diseases, monitoring the potential emergence of new pathogens and re-emergence of pathogens previously controlled, and assessment of changes in pathogen antibiotic-resistance as well as the socio-demography of patients are among the objectives of this programme. (See *Hospital Surveillance Programme*, page 27 and table, page 24).

The Division conducted its activities in 1996 with the support of 176 fixed-term personnel (29 at the National Officer level and 147 at the General Service levels) of whom 135 were core staff and 41 were project staff. In addition, 82 health workers, 17 trainee doctors, 10 trainee nurses, and 2 international trainee

Other activities in 1996

- A CSD division retreat was conducted in early 1996 and the Biennial Workplan for 1997-98 was prepared.
- The CSD Surveillance Programme was reduced from a 4% to a 2% subsample of all patients presenting to CRSC for treatment. Testing for *E. coli* that cause diarrhoea (ETEC [ST, LT, ST/LT], EPEC [LA, AE, LA/AE], EAaggEC, and DA) was added to the routine surveillance.
- Screening of all blood products (HIV, VDRL, and HBV) given in the hospital was instituted. An Infection Control programme was begun to emphasise "universal precautions" and prevention of nosocomial infection. The training of selected staff as pre- and post-HIV testing counsellors and to act as CSD educators to increase awareness of HIV infection was also initiated.
- A standardised protocol for the treatment of severely malnourished children with acute illness was developed in collaboration with the LSU Department of Pediatrics and implemented throughout CRSC. This protocol is expected to result in a significant reduction in deaths associated with severe malnutrition.
- Construction and renovation of the hospital and CSD, begun in 1995 through a donation from the Government of Bangladesh, continued in 1996. This will increase space for patient beds and activities as well as revise office and training facilities.
- The initiative that was begun in 1995 to strengthen the nursing programme continued in 1996. In-house training sessions were implemented after a baseline needs assessment. Remedial English language training is being provided for nursing staff to increase staff development opportunities. Senior personnel and responsibilities were reassigned to establish a Nursing Administration structure.

fellows assisted in the activities of the Division. The initiative that was begun in 1995 to strengthen the nursing programme continued to be an emphasis in 1996. Three senior paediatricians and a radiologist continued to provide consultancy for better training of the doctors and clinical fellows of the Division.

Clinical Research and Service Centre (CRSC)

Chief Physician: M.A. Salam

Funded by: USAID, the Government of Japan
and Core funds

A total of 108,566 patients, 61% of whom were under-5 children, received treatment at the Clinical Research and Service Centre in 1996. This was 6,163 (5%) patients fewer than in 1995. The outbuilding or "pavilion" on the south side of CRSC, originally a temporary construction since 1993, remained useful in 1996 due to the high number of patient visits as well as the reduction of beds in the Short Stay Ward (SSW).

Of the 108,566 patients treated, 59,157 (55%) required admission to SSW and were hospitalised for an average of 20 hours, and 5,720 (5%) were admitted to the General and Special Care Wards (GW and SCW) because of complicated illness. Average stay in the GW and SCW wards was 5.7 days.

Of the total admissions to the GW and SCW there were 357 deaths (6%) and of the 59,157 patients admitted to the SSW, 23 (0.04%) died.

A total of 455,125 litre of oral rehydration fluids and 124,777 litre of intravenous fluids (ratio, 3.6:1) was used at CRSC in 1996.

Clinical Research

Although research is implemented in all the wards of CRSC, there are special research wards with support staff who have the expertise to implement more complex protocols. A variety of studies are conducted in the 15-bed Clinical Study Ward including studies on the pathophysiology of diarrhoeal and other diseases, improved case management, development of improved ORS, vaccine studies, and therapeutic interventions in diarrhoeal diseases, development of therapeutic diets, and so forth.

The Metabolic Research Ward has 12 beds for metabolic and nutrition balance studies. Research projects conducted in this ward include those designed to improve understanding of the nutritional impact of diarrhoeal diseases and to develop nutritional intervention strategies.

It is expected that these studies will increase the knowledge of the pathophysiology of the complications seen in association with nutritional and diarrhoeal diseases and provide the basis for new and innovative interventions. A total of 659 patients were admitted to the two research wards of CRSC under 14 different research protocols in 1996 with an average stay of 5.7 days.

Physiology Laboratory

Coordinator: G.H. Rabbani

The Physiology Laboratory (PL), established in 1995, provides opportunities to CSD and LSD scientists for carrying out more basic research and has resources in laboratory and other equipment in support of clinical and animal experimentation in selected fields with direct relevance to the clinical research programme.

Activities continued to be expanded in this laboratory during 1996: The Griess reaction to measure metabolites of nitric oxide (NO) as well as assays of reactive oxidative species (ROS) including thiobarbituric acid reacting substances (TBARS), peroxynitrite, glutathione reductase, and the total radical antioxidant parameters (TRAP) were established.

Animal studies and clinical trials are in progress to assess the relationship of intestinal disease activity with these two central mediators of inflammation and tissue damage (oxidative stress, nitric oxide activity), and the effect of antioxidants as therapeutic strategies.

Techniques to study epithelial transport (intestinal perfusion, Ussing chamber) in animal models were also established and will be used to study epithelial ion transport and to assess the therapeutic potential of pharmacologic agents in the pathogenesis and therapy of diarrhoea, especially shigellosis and cholera. Body composition laboratory activities within the laboratory have undergone further development, with new uses of BIA being validated to assess gastric acid output and hydration status.

Child Health Programme

Coordinators: M.A. Salam, M. Ali and T. Ahmed

Funded by: Core funds and UNICEF

Since 1988 the Child Health Programme (CHP) has been offering preventive health care to children and their mothers reporting to CRSC. The programme also conducts research and training. Preventive services include health education, immunisation, inpatient and outpatient nutritional rehabilitation, growth monitoring, and family planning. During 1996, as many as

CSD 29,317 group sessions on health education were conducted with mothers of patients on home management and prevention of diarrhoea, immunisation and nutrition, covering about 175,902 mothers and guardians (94% of the target group) reporting to CRSC. Children less than 2 years of age admitted to the hospital were immunised against 6 vaccine-preventable diseases and tetanus toxoid was administered to mothers of children seeking treatment for diarrhoea at CRSC.

A total of 7,492 children (98.7% of the eligible children) were immunised by the programme as were hundreds of their siblings, making CRSC the largest fixed immunisation site in Bangladesh. A total of 20,274 women also received either their first or second dose of tetanus toxoid.

About 80% of all children treated at CRSC had some degree of malnutrition, and nearly 80% of those admitted to one of the inpatient wards had moderate or severe malnutrition. Health workers provided dietary counselling to mothers of these malnourished children.

Among the most severely malnourished, 211 children and their mothers were kept in the in-patient Nutritional Rehabilitation Unit (NRU). Mothers of an additional 1,527 severely malnourished children who

could not be given in-patient service were referred to the out-patient Nutritional Follow-up Unit (NFU) of the programme in 1996.

During the year a total of 12 papers were published by the scientists of the Division and 17 papers are in press. Including pilot studies, 16 new protocols were developed and 21 research protocols are ongoing.

Travellers' Clinic

A total of 77 patients attended the clinic for consultation in 1996. As in previous years, the clinic also processed several hundred clinical specimens submitted by various individuals (both physician-referred and self-referred) and from clinics within Dhaka for clinical pathology, microbiological investigations, biochemical tests, etc. In addition, 46 patients underwent endoscopic examinations during 1996.

RESEARCH

CSD's research activities are conducted along the following broad themes:

■ CASE MANAGEMENT RESEARCH

Nutritional therapy
 Fluid therapy
 Pharmacological therapy

■ PATHOPHYSIOLOGICAL RESEARCH

■ PREVENTATIVE/MATERNAL CHILD HEALTH RESEARCH

CASE MANAGEMENT RESEARCH

Nutritional Therapy

Vegetable protein source for refeeding malnourished children recovering from shigellosis

PI: I Kabir

Funded by: The International Atomic Energy Commission

The objectives of this study are to evaluate the efficacy of a low-cost plant protein-based diet to promote catch-up growth of malnourished children during recovery from shigellosis.

Ninety malnourished Bangladeshi children aged 24-60 months with acute shigellosis are to be admitted to CRSC's Metabolic Ward, where the relative efficacy of a standard protein diet will be compared with two other nutrient-dense diets, an animal protein-based diet with 15% energy as protein and another with the same energy content but based on plant protein. Children are randomised after clinical recovery from shigellosis to one of these three diets and are fed for 21 days.



Dr. George J. Fuchs, Director, CSD, explains the activities of the Division to David Adams (center) and Stephen Blake (right), members of the International Relations Committee, US House of Representatives.

Anthropometry, serum proteins, plasma IGFs, body composition, and protein turnover will be measured and compared before and after dietary supplementation of the three diet groups. The children will be followed over the ensuing 3 months to assess subsequent growth and morbidity. So far, 33 subjects have been recruited. The study should be completed by December 1997.

Effect of a soluble fiber (partially hydrolysed guar-gum)-supplemented Oral Rehydration Solution in the treatment of acute non-cholera diarrhoea in children

PIs: N. H. Alam, R. Meier and K. Gyr.

Funded by: SANDOZ Nutrition, Switzerland

This is a controlled clinical trial to study the effects of an ORS supplemented with a soluble fiber in the treatment of acute non-cholera diarrhoea in children. Partially hydrolyzed guar-gum (Sun Fiber) is a soluble fiber fermented by colonic bacteria yielding short-chain fatty acids hypothesised to reduce the duration and severity of diarrhoeal illness through acceleration of colonic absorption of salt and water.

Male children between the ages of 4 and 18 months with a history of acute watery diarrhoea with mild or moderate dehydration were randomised to receive either WHO-ORS or WHO-ORS-soluble fiber. Children receiving the fiber-supplemented ORS had reduced duration of diarrhoea compared to the control group (mean $\pm$ SEM, 74 ± 4 vs. 90 ± 6 hr, $p = 0.03$).

Total stool weight until recovery was also significantly less in the fiber group than in the control group (370 ± 46 vs. 507 ± 64 g/kg. body wt., $p = 0.03$). The beneficial effect of the fiber was more pronounced in children below 10 months of age.

In this age group, compared to age-matched controls, diarrhoea duration was significantly shorter (70 ± 5 vs. 97 ± 8 hr, $p = 0.004$) and total stool weight until recovery (370 ± 46 vs. 507 ± 64 , $p = 0.03$) as well as stool weight from day 3 to day 7 was reduced ($p = 0.04, 0.01, 0.05, 0.02, 0.03$ respectively). It is concluded that soluble fibers have potential as a new antidiarrhoeal therapy of acute diarrhoea in children.

Dietary fiber and short-chain fatty acids in the management of persistent diarrhoea

PIs: G.H. Rabbani, T. Teka and G.J. Fuchs

Funded by: USAID

Although persistent diarrhoea is a major cause of growth failure and death of children in developing countries, a satisfactory form of treatment either by diets or pharmacological agents has been elusive.



Experimentation in progress at the Physiology Laboratory, Clinical Sciences Division.

Dietary fibers are fermented by colonic bacteria to yield short-chain fatty acids (SCFAs), which have beneficial effects on large and small bowel morphology and function. And while certain dietary fibers have been found to be effective in many types of gastrointestinal disorders, their role in persistent diarrhoea has yet to be fully investigated. This is currently being done in a controlled clinical trial in children 5 to 14 months of age with persistent diarrhoea.

Three diets are being compared: a standard diet supplemented with pectin (a fiber known to generate high quantities of SCFAs), cooked unripe banana (another excellent source of pectin, which, preliminary observations suggest, has antidiarrhoeal properties), or an unsupplemented diet.

The effects of these 3 different diets will be evaluated on intake, weight gain, stool output, macronutrient absorption, intestinal permeability, stool SCFA concentration, and recovery from persistent diarrhoea. Forty-nine of the programmed 65 children have completed the study thus far. If found effective, specific dietary fibers have the potential to be a simple, inexpensive, safe, culturally acceptable, and accessible therapeutic modality in the management of persistent diarrhoea.

CSD Trial of antioxidant intervention in children with acute shigellosis

PIs: M. Ali, G.J. Fuchs and M.A. Khaled

Funding: USAID and Core funds

Recent evidence indicates that nitric oxide (NO) and reactive oxygen species (ROS) are important regulators of inflammation and idiopathic inflammatory bowel disease. The hypothesis of this pilot study is that specific antioxidants in children with acute shigellosis can reduce oxidative stress and NO production, thereby reducing tissue inflammation and improving clinical outcome.

Children aged 18-60 months with acute shigellosis are randomised to daily administration for 5 days of either oral β -carotene, selenium and alpha-tocopherol or a placebo. All are given standard antibiotic therapy.

In addition to clinical outcome, lipid peroxidation (a measure of oxidative stress) will be assessed by blood and urinary excretion of thiobarbituric-reacting substances (TBARS), and antioxidant activity by total radical antioxidant parameters (TRAP). Inducible nitric oxide synthase (iNOS) activity will be assessed by blood and urine nitrate/nitrite with the Griess reaction.

Standardised treatment of severely malnourished children with acute illness

PIs: M. Ali, T. Ahmed, R.M. Suskind and G.J. Fuchs.

Funded by: USAID, the Government of Japan, and Core funds

The death rate of children with severe malnutrition and acute infection is extreme. A comprehensive, standardised treatment protocol was therefore developed for such children admitted to the Clinical Research and Service Centre. The protocol provides treatment regimens for the severely malnourished child in an acute stage of illness as well as subsequent nutritional rehabilitation. It emphasises the specific needs of severely malnourished children undergoing rehydration therapy, nutritional therapy, antimicrobial therapy, and management of complications.

The protocol is now being tested as a pilot study with 60 children already enrolled so far. Variables including death rate, incidence of complications, use of intravenous vs. oral rehydration fluids, duration of hospital stay, and total cost of treatment will be compared for a 1-year period between the protocol patients and those treated the year before the protocol started. Specific aspects of the protocol that are yet to be defined – such as the type and delivery of antibiotics and micronutrients – will also be tested. It is anticipated that the standardised protocol will reduce mortality as well as treatment cost.

Fluid Therapy

For the past 20 years the WHO formulation of ORS has been the standard for rehydration of children and adults with dehydration due to diarrhoea. However, there is some question about the ideal composition of ORS solution, especially the sodium concentration and total osmolality.

The results of recent studies have suggested the possible superiority of different ORS solutions of reduced sodium and osmolality over standard WHO-ORS, although the results so far are inconclusive.

ICDDR,B is participating in two trials to evaluate the efficacy and safety of reduced-osmolality ORS (Na 75, glucose 75, mmol/L; osmolality 245 mOsmol/L) compared to the standard WHO ORS (Na 90, glucose 111 mmol/L; osmolality 311 mOsmol/L) formulation. The first is in adults with cholera, with ICDDR,B as the sole study site. The second study is a multicentre trial in children with watery diarrhoea of any cause. This study is supported by UNICEF, USAID, WHO, and ARCH.

Clinical trial to evaluate the efficacy of reduced-osmolality ORS solution in adult patients with cholera

PIs: N.H. Alam & G.J. Fuchs

Funded by: UNICEF, USAID and WHO

This is a double-blind, randomised trial to determine the efficacy and safety of reduced-osmolar ORS compared to standard WHO-ORS in adults with cholera. Patients attending the ICDDR,B treatment centre in Dhaka with a history of watery diarrhoea of less than 24 hours duration are enrolled into the study. All intakes and outputs including ORS, plain water, food, stool, urine and vomitus are measured.

All the patients will receive oral erythromycin. Outcome measures including stool volume, duration of diarrhoea, and the need for unscheduled I.V. fluids are compared between the groups. Of the 300 patients to be enrolled, 220 patients have completed the study so far.

A multicentre study to evaluate the efficacy of reduced-osmolality ORS solution in children with acute watery diarrhoea

PIs: R.N. Majumder & G.J. Fuchs

Funded by: UNICEF & WHO

CSD is participating in this ongoing multicentre study to evaluate the efficacy and safety of a reduced-osmolality ORS compared to standard WHO-ORS in children aged 1 to 24 months with acute watery diarrhoea. Of a

total of 600 children from 5 countries, 150 will be studied in Dhaka at ICDDR,B's diarrhoea treatment centre. Children attending CRSC with a history of watery diarrhoea of less than 72 hours' duration will be studied until cessation of the diarrhoea. All intakes and outputs such as ORS, plain water, food, stool, urine and vomitus will be measured. On completion of the study, important variables (e.g., stool/kg, duration of diarrhoea, unscheduled I.V. fluids) will be compared between two groups. Of the 150 patients to be studied, 140 have already completed the protocol.

Evaluation of reduced-osmolarity oral rehydration solution (glucose- and rice-based) in children with persistent diarrhoea

PI: S.A. Sarker

Funded by: USAID

Although persistent diarrhoea accounts for 10-15% of all diarrhoea, it accounts for 34-63% of all diarrhoea-related deaths among children in developing countries. As with acute diarrhoea, the management of persistent diarrhoea is based on maintaining hydration and nutrition.

The standard ORS recommended by the World Health Organization (WHO) contains relatively high concentrations of salt and glucose, and is more osmolar (311 mOsmol/L) than blood (280 mOsmol/L). For this reason, there is concern that standard WHO-ORS might result in a flow of extracellular body fluid into the intestine and thus worsen the diarrhoea.

The purpose of this study is to evaluate one of two reduced-osmolarity ORS preparations:

- ☐ a glucose-based reduced-osmolarity ORS (Na and glucose 75 mmol/L each; osmolarity 245 mOsmol/L); or
- ☐ a rice-based reduced-osmolarity ORS (Na 75 mmol/L; rice powder, 50 g/L; osmolarity 170 mOsmol/L)

These two preparations will be compared with the standard WHO-ORS (Na 90 and glucose 111 mmol/L; osmolarity 311 mOsmol/L) for replacement of ongoing stool loss for 7 days in children with persistent diarrhoea in a randomised controlled clinical trial.

Stool output, intake of ORS and duration of diarrhoea will be compared among the three groups. Of the 132 programmed cases, 58 have been recruited so far. If reduced-osmolarity ORS is found to be beneficial in hastening recovery, this would have important therapeutic implications in the case management of persistent diarrhoea.

Pharmacological Therapy

Successful treatment of rotavirus diarrhoea in children with immunoglobulins from immunised bovine colostrum: a double-blind placebo-controlled trial

PIs: S.A. Sarker & T. Casswall

Funded by: SAREC, Sweden

Passive immunity with secretory immunoglobulin preparations from immunised cow colostrum (HBC) as prophylaxis against a variety of gastrointestinal infections has been previously assessed. However, treatment efficacy of HBC has not been adequately studied. This study tested the therapeutic use of HBC containing a high titre of antibody against all rotavirus serotypes to reduce the duration of diarrhoea and accelerate the clearance of pathogen in children with rotavirus diarrhoea.

Eighty male children attending CRSC with confirmed rotavirus diarrhoea were randomly assigned to treatment with either 10g of HBC containing 2g of anti-rotavirus immunoglobulin dissolved in water (divided into 4 daily doses for 4 days) or the same amount of a placebo preparation. The children who received HBC required significantly less oral rehydration solution ($p < 0.05$) and had less daily total stool output than the placebo group ($p < 0.05$). The clearance of rotavirus from the stool was also observed earlier in the treatment group (mean day 1.5 vs. 2.9, $p < 0.001$).

Treatment with anti-rotavirus immunoglobulin from hyperimmunised cows is effective in the treatment of children with acute rotaviral diarrhoea and suggests that passive immunotherapy is useful not only prophylactically but also therapeutically.

Treatment of *H. pylori* infection in children using hyperimmune bovine colostrum (HBC)

PIs: S.A. Sarker & L. Hammarstrom

Funded by: SAREC, Sweden

Infection with *Helicobacter pylori* is increasingly recognised as common in children in developing countries, with a prevalence of up to 60% in children below one year of age. Infection with *H. pylori* is associated not only with gastritis, hypochlorhydria and peptic ulcer diseases but also with gastric cancer.

In addition, a close association between *H. pylori* and chronic diarrhoea and growth-faltering in children has been reported. Effective and safe therapeutic options to eradicate this organism in children are needed.

This community-based, double-blind, placebo-controlled trial is investigating the efficacy of orally administered anti-*H. pylori* HBC in children with *H. pylori* gastric infection that has been documented by the urea

breath test. Twenty-four of the 60 programmed children have been enrolled in the study so far.

Hyperimmune bovine colostrum (HBC) in the treatment of *E. coli* diarrhoea

PIs: S.A. Sarker & L. Hammarstrom

Funded by: SAREC, Sweden

Enterotoxigenic *Escherichia coli* remains an important cause of childhood morbidity and mortality. Although Oral Rehydration Therapy is safe and effective for most children with diarrhoea due to those pathogens, it does not substantially reduce diarrhoea severity or duration. This has resulted in the use of drugs that are ineffective and potentially harmful.

Passive immunity with secretory immunoglobulin preparations from immunised cow colostrum (HBC) as prophylaxis against a variety of gastrointestinal infections has been previously assessed. The object of this study is to investigate the efficacy, in a double-blind placebo-controlled trial, of orally administered anti-*E. coli* HBC in children with acute ETEC diarrhoea. Of the 80 programmed cases, 60 children have been studied so far.

Randomised, controlled comparison of azithromycin and ciprofloxacin for the treatment of shigellosis

PI: M.A. Salam

Funded by: USAID, the Government of Japan and Core funds

In this randomised, double-blind clinical trial, adult males with bloody diarrhoea were given either 500mg oral azithromycin on the first day followed by 250mg

every 24 hours for another 4 days, or 500mg oral ciprofloxacin every 12 hours for 5 days. Therapy was clinically successful in 28 (82%) out of 34 patients who received azithromycin, and in 32 (89%) out of 36 patients who received ciprofloxacin [95% CI - 23%, 10%]. Therapy was bacteriologically successful in 32 (94%) and 36 (100%) of the patients respectively [95% CI -14%, 2%].

The median number of stools during the study was comparable in the treatment groups (29 vs. 24; NS). The peak serum concentration of azithromycin was lower than the MIC of the infecting *Shigella* strains. However, its stool concentration was >200 times the MIC. Neither of the study drugs was associated with any serious adverse event. In doses used in this study, azithromycin was effective in the treatment of shigellosis in adults.

Comparison of the safety and efficacy of a suspension formulation of ciprofloxacin with tablet formulation of amdinocillin pivoxil in the treatment of acute dysentery caused by *Shigella* in children

PI: M.A. Salam

Funded by: Bayer AG, Germany

The objective of this randomised, double-blind trial is to compare the efficacy and safety of a suspension formulation of ciprofloxacin compared to amdinocillin pivoxil in the treatment of children with acute shigellosis.

One hundred and twenty children, 2 to 15 years old, will receive either 10mg/per kg body wt. of ciprofloxacin suspension every 12 hours, or 10-20mg/per kg body wt. of amdinocillin pivoxil tablets every 6 hours for 5 days. Of the 112 patients enrolled in this study so far, 95 will be used for analysis.

Evaluation of tetracycline in patients infected with tetracycline-resistant strains of *Vibrio cholerae* O1

PIs: U. von Gierke & A.M. Khan

Funded by: USAID

This is a study to evaluate the clinical efficacy of tetracycline in patients infected with tetracycline-resistant strains of *Vibrio cholerae* O1. Since 1991, the prevalence of *Vibrio cholerae* strains resistant to tetracycline has increased in Bangladesh to nearly 20%. Because approximately 55% of orally administered tetracycline is excreted in faeces, it is hypothesised that tetracycline will be effective in cholera caused by tetracycline-resistant strains. Sensitivity by the disk diffusion method, MIC, and faecal tetracycline concentration will be determined in cases with positive *V. cholerae* O1 stool culture. Adult patients with less than 24 hours' acute watery diarrhoea, with no history of



A nurse tends to a tiny infant admitted to CRSC's Special Care Unit while the child's mother, clad in the traditional "burqah" worn by many Muslim women, looks on.

intake of effective drugs, and with a positive darkfield examination will be studied. All patients with *V. cholerae* O1 infection (tetracycline-sensitive and -resistant) are treated with 500mg tetracycline every 6 hours for 3 days. Excretion of *V. cholerae* and clinical efficacy will be assessed. One hundred and fifty-two cases have been enrolled thus far, of which 127 are sensitive and 25 are resistant to tetracycline. Data analyses are expected to be complete by early 1997.

Randomised controlled comparison of single-dose ciprofloxacin and doxycycline for *V. cholerae* O1 or O139

PI: W.A. Khan

Funded by: Bayer AG, Germany

One hundred and thirty moderately or severely dehydrated men infected with *V. cholerae* O1, and 130 infected with *V. cholerae* O139 were randomly treated in this double-blind trial with either a single 1g oral dose of ciprofloxacin with a doxycycline placebo, or a single 300mg oral dose of doxycycline with a ciprofloxacin placebo.

Among patients infected with *V. cholerae* O1, treatment was successful in 62 (94%) of 66 patients who received ciprofloxacin, and in 47 (73%) of 64 who received doxycycline [95% CI 8 - 33]; the corresponding proportions with bacteriological success were 63 (95%) and 44 (69%) [95% CI 14 - 39] respectively. Among patients infected with *V. cholerae* O139, treatment was clinically successful in 54 (92%) out of 59 patients who received ciprofloxacin and in 65 (92%) out of 71 who received doxycycline [95% CI -9 to 9]; and bacteriologically successful in 58 (98%) and 56 (79%) [95% CI 9 - 30] respectively.

The total volumes of watery stool did not differ significantly between the ciprofloxacin group and the doxycycline group, whether infected with *V. cholerae* O1 or O139. Single-dose ciprofloxacin is as effective as doxycycline in the treatment of cholera caused by *V. cholerae* O1 and O139, and may be preferred where tetracycline-resistant *cholerae* are common.

PATHOPHYSIOLOGICAL RESEARCH

Study of immune disruption caused by measles and its association with clinical progress in Dhaka, Bangladesh

PIs: S.M. Akramuzzaman, Felicity Cutts and

V. ter Meulen

Funded by: The European Union

This study investigates the role of preferential activation of Type 2 T-helper cells (T_H2) as an underlying

biological mechanism for excessively delayed morbidity after measles. Morbidity will be monitored after acute measles or complicated measles and compared to healthy children and children with other diseases.

One hundred and ten children were recruited in each group and examined weekly for six months. Measles infection has been confirmed by serology and preferential activation of T_H2 cells will be evaluated by comparing IFN- γ and IL-4 levels. Lympho-proliferative response to stimulation with measles virus and cytokine profiles on supernatants of cultured peripheral blood mononuclear cells (PBMCs) will be assessed in a subsample of subjects. The consequences of down-regulating CD46 and MOESN on the surface of primary or persistently infected tissue culture cells on cell function will also be investigated.

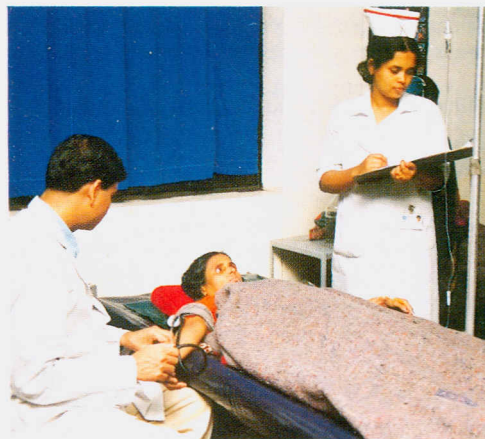
Laboratory assays are being done at the Centre and at the University of Wurzburg, Germany. It is expected that these studies will identify the possible underlying biological mechanisms for excessively delayed morbidity following measles, and will provide important information toward the development of new measles vaccines.

Immunologic effect of vitamin A and zinc in a placebo-controlled trial

PI: S.K. Roy

Funded by: USAID

Although vitamin A deficiency is associated with increased deaths due to diarrhoeal and RTI infections, the role of vitamin A in human immune response is not completely understood. In this study, 200 children aged 1-3 years and with weight-for-age between 60 to



A patient is examined by an investigator in the Metabolic Study Ward, CRSC.

75% are randomised to receive (200,000 IU) vitamin A, 40mg elemental zinc, both, or a placebo for 7 days. Serum IgA, IgM, IgG, lymphocyte enumeration and proliferative response, and skin test reactivity to multiple antigens are assessed before and 8 weeks after treatment. The serologic response to measles vaccine is also tested in unimmunised children in all groups. Morbidity and anthropometry are assessed weekly for two months. A total of 190 children have been enrolled into the protocol so far.

Development of a bioelectrical impedance analysis (BIA) method to assess hydration states in humans

PIs: M.A. Khaled & I. Hossain

Funded by: USAID

A dual-frequency BIA method was applied to assess the hydration status of 19 adult patients (12 male and 7 female) aged 30 $\pm$ 8 years with acute watery diarrhoea (13 cholera) and severe dehydration defined clinically according to current WHO guidelines.

After initial hydration, all patients were maintained by rice-ORS. BIA measurements were made at 0 h, 2 h, 6 h, and 24 h. Changes in body water compartments – total body water (TBW), extracellular (ECW) and intracellular (ICW) water – from admission to 24 hours were measured by BIA. The 13 dehydrated patients with cholera gained significantly more water, mainly in the ICW compartment, than those with non-cholera.

Cholera patients had significantly greater depletion of ICW, which can be attributed to the severity of dehydration. The BIA is a simple, non-invasive tool that provides better definition of hydration status and more precise characterisation of the severity of dehydration than existing clinical criteria. It is currently being used to assess the effects of ORS with different osmolarities.

Predictors of serum retinol in children with shigellosis

PIs: A.K. Mitra & C.B. Stephenson

Funded by: USAID and the University of Alabama

Serum retinol of 90 children with dysentery was prospectively assessed and the relationship of retinol with severity of illness, nutritional status, and acute phase proteins was characterised. Serum retinol was transiently depressed on admission but increased to normal levels without vitamin A supplementation at discharge (0.36 vs 1.15 mmol/L, $p < 0.001$).

There was a significant and positive correlation between serum retinol and weight-for-height ($r = 0.48$, $p < 0.001$) and height-for-age ($r = 0.34$, $p < 0.01$), and a negative correlation with C-reactive

protein ($r = -0.60$, $p < 0.001$) and alpha-1 acid glycoprotein ($r = -0.55$, $p < 0.001$). Weight-for-height and severe infection with *S. dysenteriae* 1 (compared to other *Shigellae*) significantly predicted changes in serum retinol, after controlling for other confounding variables. This study demonstrates that blood vitamin A is transiently depressed in children with shigellosis, and the changes in serum retinol are significantly associated with poor nutritional status, fever, severity of illness, and acute phase proteins.

Intestinal transport of water, sodium and glucose from an electrolyte solution with and without bicarbonate

PIs: S. Islam

Funded by: The Programme Coordination Committee, ICDDR,B

In this study the role of bicarbonate on water and sodium transport in normal and secreting ilea of rabbits was evaluated, using the ligated ileal loop method with a non-absorbable marker (PEG 4000). The mean $\pm$ SE of water and sodium absorption, with bicarbonate versus without bicarbonate was -1.4 ± 0.1 vs. -1.1 ± 0.3 ml/10 cm/h, ($p = 0.18$), and -340.8 ± 23 vs. -308.4 ± 36 mM/10 cm/h, ($p = 0.44$) respectively from secreting rabbit ilea, with a similar effect observed in normal ilea. It is concluded that bicarbonate containing electrolyte solution does not promote water and sodium absorption in ilea of rabbits.

Non-invasive assessment of gastric acid secretion in man: Application of electrical impedance tomography (EIT)

PI: S. A. Sarker

Funding: Swiss Development Cooperation

EIT is a tubeless technique that generates tomographic images which was used and compared with the standard intubation test to measure gastric acid secretion in 19 normal subjects. Basal acid output (BAO) and simulated acid output (SAO) were measured in mmol/h before and after pentagastrin stimulation, respectively. EIT was performed before (basal) and after pentagastrin stimulation.

Testing was repeated in 13 subjects after pretreatment with omeprazole. The changes in impedance (EIT) over time were measured and the area under the curve (AUC) was calculated. In the intubation test, there was an expected increase in AUC after pentagastrin stimulation ($p < 0.0001$).

A significant fall in acid output and AUC was observed following omeprazole pretreatment both with and without pretreatment for the intubation test,

$p < 0.0001$; and for EIT, $p < 0.0001$). There was a significant correlation between SAO and the change in AUC with ($r = 0.65$, $p < 0.001$) or without ($r = 0.95$, $p < 0.001$) omeprazole and all experiments ($r = 0.87$, $p < 0.001$).

This study demonstrated predictable changes of gastric impedance in different states of gastric acid secretion, and indicates that EIT may be useful as a non-invasive test for measuring gastric acid secretion.

PREVENTATIVE/MATERNAL CHILD HEALTH RESEARCH

Impact of peer counsellors on infant feeding practices of mothers in the urban community

PI: R. Haider

Funded by: Swiss Development Cooperation

The objectives of this study are to assess the impact of mothers trained as peer counsellors in the urban community in supporting other mothers to adopt exclusive breastfeeding for the first five months of the baby's life and to start appropriate complementary feeding at the onset of the sixth month.

Twenty mothers, trained as peer counsellors by the breastfeeding counsellors of ICDDR,B, are responsible for counselling pregnant women in their neighbourhood and then following them after delivery until the infants are one year of age. The study is ongoing with 600 mothers enrolled in the study so far.

Study to determine the importance of nosocomial transmission of measles and to validate salivary IgM assay for diagnosis of recent measles infection

PI: M. Akramuzzaman

Funded by: Swiss Development Cooperation

A clinic-based, case-control study is being conducted to evaluate whether health facility visits are a risk factor in measles transmission. Two hundred and ninety-four measles cases and 1,176 controls with other diseases have been recruited from ICDDR,B's Clinical Research and Service Centre and from the Dhaka Shishu (Children's) Hospital. Another 1,176 healthy controls have been selected from the same neighbourhoods as the study children. This study is also validating salivary IgM assay against serology (serum IgM). A sub-sample of 80 measles cases and 80 controls recruited for the above study are being used to validate this technique.

The salivary IgM assay has the potential for use as a non-invasive technique for the confirmation of measles in a variety of epidemiological studies on measles in developing countries.

Double-blind randomised controlled trial of zinc and vitamin A in young children with acute diarrhoea

PIs: A.S.G. Faruque & D. Mahalanabis

Funded by: USAID

The effect of supplementation with zinc, vitamin A, both, or a placebo on diarrhoea duration and the development of prolonged diarrhoea was evaluated in 684 children in a randomised, double-blind, controlled trial. Children aged 6 to 24 months with a history of acute watery diarrhoea for 3 days or less and with some dehydration were studied.

At enrollment the children were randomised to receive: (a) vitamin A 15,000 units daily for 15 days; (b) daily zinc acetate containing 14.2mg elemental zinc (first consecutive 417 children) or 40mg elemental zinc (remaining 273 children) for 15 days; (c) both vitamin A 15,000 units daily plus zinc daily as in (b); or (d) a placebo mixture daily for 15 days. In the zinc-supplemented group compared to the non-supplemented group, the mean duration of diarrhoea was reduced by 13% ($p = 0.03$), risk of a subsequent episode of diarrhoea was reduced by 20% ($p = 0.006$).

The proportion of children still having diarrhoea on days 4, 7, and 16 decreased by 19% ($p = 0.057$), 36% ($p = 0.028$), and 33% ($p = 0.43$) respectively; and the risk of episodes >7 days was reduced by 43%. Zinc supplementation may, therefore, help prevent prolonged diarrhoea in children with acute diarrhoeal illness.

Dietary fat and infection: relationship to vitamin A status of women and their infants

PIs: G.J. Fuchs & D.S. Alam.

Funded by: Opportunities For Micronutrient Intervention (OMNI) and USAID

Although increased intake of dark-green leafy vegetables (DGLV) is universally promoted as a sustainable method to improve vitamin A (VA) status in developing countries, recent evidence indicates concern that this approach fails to improve VA status as predicted. Dietary fat, essential for maximal utilisation and absorption of ingested provitamin A from DGLV, is very low in VA-deficient populations around the world.

Various infections also tend to inhibit VA absorption or increase urinary excretion of VA, thereby worsening VA status. A CSD/PHSD study is in progress to investigate the effect of increased dietary fat on VA status in pregnant and lactating women. The impact of infection is also being studied. Breastmilk and VA status of their infants as related to maternal dietary fat and infection will also be assessed.

Aetiological agents isolated from patients in the surveillance programme in 1996

MONTHS	Number of patients	<i>V. cholerae</i> O1	<i>V. cholerae</i> O139	<i>Shigella</i>	<i>Salmonella</i>	Rotavirus	Other vibrios
JANUARY	149	12	1	15	1	55	11
FEBRUARY	106	4	0	5	1	31	4
MARCH	133	16	0	5	2	20	11
APRIL	242	30	5	21	6	20	19
MAY	238	40	7	17	7	39	22
JUNE	190	32	3	15	2	44	16
JULY	191	27	3	7	7	34	19
AUGUST	207	32	8	12	15	50	25
SEPTEMBER	230	44	12	17	3	35	18
OCTOBER	170	26	13	14	7	17	34
NOVEMBER	147	20	9	16	6	36	22
DECEMBER	168	31	2	20	2	73	26
TOTAL	2,171	314	63	164	59	454	227

%

14.5%

2.9%

7.6%

2.7%

20.9%

10.5%

Estimated*

108,550

15,700

3,150

8,200

2,950

22,700

11,350

*Extrapolated to the total number of patients attending CRSC from the 2% sub-sample
(See text for prevalence of different pathogenic *Escherichia coli*.)

Of the 600 pregnant and lactating women already enrolled in this study, half will receive supplemental dietary fat. Longitudinal assessment of provitamin A intake, quantification of dietary fat, retinol and carotenoids concentration of maternal/infant plasma and breastmilk, maternal/infant anthropometry, and assessment of maternal and infant infection morbidity including parasitosis will be conducted. Data collection is in progress.

Surveillance of HIV-1 seropositivity in Bangladeshi children with persistent diarrhoea and malnutrition

PI: G.J. Fuchs

Funding: USAID, the Government of Japan, Core funds & the University of Alabama-Birmingham

Persistent diarrhoea with malnutrition is one of the more common severe conditions in children admitted to ICDDR,B's Dhaka treatment centre. In regions endemic for HIV infection, the combination of PEM and persistent diarrhoea in children is a common feature of maternally acquired paediatric HIV infection.

In endemic areas, children with persistent diarrhoea and malnutrition have up to a 40-fold increase in the prevalence of HIV infections as compared to the general population. The presence of HIV infections in children with persistent diarrhoea and malnutrition would affect the results and interpretation of epidemiological and intervention studies of these illnesses.

A continuous de-linked and anonymous surveillance system was established at the end of 1995 to determine the prevalence of HIV seropositivity in all children two years of age or younger admitted to CRSC with persistent diarrhoea and malnutrition. These children will initially be screened for seropositivity by ELISA, with positives confirmed by Western Blot, and further characterisation of strain by PCR.

It is expected that this continuous surveillance will be a valuable sentinel surveillance for HIV infection in Dhaka, and will indicate when HIV infection in these patients might represent a confounding variable in the Centre's persistent diarrhoea and malnutrition protocols.

Helicobacter pylori infection as a risk factor for acute diarrhoea and persistent diarrhoea: a prospective case-control study

PI: P.K. Bardhan

Funded by: USAID

Hypochlorhydria predisposes to gastro-intestinal infections. *H. pylori* infection is a major cause of human gastritis and is associated with gastric hypochlorhy-

dria. A prospective, clinic-based and case-control study with age-matched community controls is in progress to ascertain if *H. pylori* infection is a risk factor in either acute or persistent diarrhoea in children.

The disease status is characterised by history, C-urea breath test, and specific serology in 100 children 3-24 months of age in each group. Data about other potential confounding variables, i.e. socioeconomic status, nutritional status, feeding, sanitation, CMI, faecal pathogens, vitamin A and zinc status are also being collected. Preliminary analysis of data indicates that the prevalence of *H. pylori* infection is very high in young children in Bangladesh. Of the estimated samples of 150 for persistent diarrhoea (PD), 150 for acute diarrhoea (AD) and 300 for healthy control (HC), those enrolled so far are 121 for PD, 115 for AD and 177 for HC.

Helicobacter pylori: Prevalence, transmission, and serum pepsinogen II concentrations in children of a poor peri-urban community in Bangladesh

PI: S.A. Sarker

Funded by: USAID

Four hundred and sixty-nine infants and children one month to 8 years old were studied, and a sub-sample of 53 immediate family members was also examined. As assessed by the ¹³C-urea breath test, 61% of 1-3 months old infants were infected with *H. pylori*. This rate declined steadily to 33% in children 10-15 months of age and then increased to 84% in children 5-8 years old.

Although there was no association of *H. pylori* infection with sex, nutritional status, or family income, infection was 2.5 times higher in children with illiterate mothers. There was no difference in infection rates in family contacts of the infected (50%) compared with the non-infected (70%) infants. *H. pylori*-infected infants had



Learning at the bedside for a group of UNICEF (Bhutan) fellows visiting the Centre.

CSD

significantly higher serum pepsinogen II concentrations than non-infected infants ($p < 0.001$). These results show that infection with *H. pylori* is highly prevalent in young Bangladeshi children.

Equivalent infection rates among family contacts of the infected and the non-infected infants suggest environmental factors rather than (or in addition to) intrafamilial spread as important in poor Bangladeshi communities. The high levels of pepsinogen II in infected children might indicate the presence of gastritis in such asymptomatic children.

Aeromonas-associated diarrhoea in Bangladeshi children: clinical and epidemiological characteristics

PIs: T. Teka, A.S.G. Faruque and G. J. Fuchs

Funded by: UNDP and WHO

To investigate the role of *Aeromonas* spp. as enteric pathogens in children with diarrhoea, a case-control study was designed using the hospital surveillance database to determine specific clinical and epidemiological features associated with *Aeromonas* diarrhoea. In a three-year hospital survey of 7,398 under-5 children with diarrhoea, 405 (5.5%) had *Aeromonas* bacteria isolated from their stool, with *Aeromonas caviae* being the most prevalent species, accounting for 32% of all isolates. The faecal isolation rate of *Aeromonas* from children with diarrhoea was significantly higher compared to asymptomatic controls ($p = 0.008$).

Eighty-three percent of children with *Aeromonas*-associated diarrhoea were younger than 3 years and the majority had an acute onset of vomiting and watery diarrhoea resulting in mild and moderate dehydration. *Aeromonas* bacteria is an important and frequent cause of diarrhoea in young children in Bangladesh.

Risk factors for deaths in under-5 children attending a diarrhoea treatment centre

PIs: T. Teka, A.S.G. Faruque and G. Fuchs.

Funded by: UNDP/WHO

Univariate analysis of data from CRSC's hospital surveillance system for the period 1990-94 showed that 11 factors were significantly associated with death in a study group of 928 under-5 children: lack of breastfeeding, severe malnutrition, complicated diarrhoea, pneumonia, xerophthalmia, duration of diarrhoea 7-14 days, moderate or severe dehydration, recent history of measles, *Shigella flexneri* infection, maternal illiteracy, and very low household income.

Rotavirus diarrhoea was not associated with fatal outcome. In the assessment of severe malnutrition, weight-for-height measurement discriminated mortality risk

better than did weight-for-age or height-for-age indices. Only two factors retained their significance in the multivariate analysis: severe malnutrition and non-breast-feeding with adjusted odds ratio (95% confidence interval) of 84.2 (9.1,775.9) and 4.2 (1.3,13.2) respectively.

Epidemiology and clinical features of *Acinetobacter* bacteraemia in diarrhoeal patients

PIs: M. Iqbal Hossain & G.J. Fuchs.

Funded by: USAID, the Government of Japan and Core funds

All cases of *Acinetobacter* (A.) bacteremia in patients admitted with diarrhoea to CRSC over a 1-year period were reviewed. Of all positive blood cultures, 171 (27%) were due to *A. species* of which 138 were considered to represent significant bacteremia constituting 2.2% of all admitted patients. Forty-seven of the significant *A. bacteremic* episodes were nosocomial and nine were polymicrobial.

Most *A. bacteremia* episodes in 1-year-old children were community-acquired, while nosocomial infection was more common in children older than 1 year ($p = .01$). A majority of *A. bacteremic* under-5 children were severely malnourished, and its incidence was lowest during the post-monsoon to early winter months. *V. cholerae* O1 was isolated from the stools of 22 (17%) patients while no pathogen was identified in 64% of the patients.

A. bacteremia-associated mortality was twice (16%) that of all other patients (7.7%) ($p < .005$) and accounted for 4.7% of all hospital deaths during the study. It was concluded that bacteremia caused by *Acinetobacter* species is a major and potentially preventable cause of death among patients with diarrhoeal disease in Bangladesh.

On the basis of this retrospective study, a prospective, age- and sex-matched case-control study is in progress to better define the incidence, seasonality, risk factors for bacteremia and deaths – as well as to monitor antimicrobial susceptibility of *Acinetobacter* spp. One hundred and twenty-five cases have been enrolled into the study so far.

Pneumococcal bacteremia among patients attending a diarrhoea treatment centre

PI: U. Dhar

Funded by: USAID, the Government of Japan, and Core funds

Records of 156 patients treated at CRSC for diarrhoeal disease and pneumococcal bacteremia between January 1990 to December 1993 were reviewed in this retrospective, case-control study. Pneumococcal bac-

teremia accounted for 1.8% (165) of all cases of bacteremia. Nine percent of the episodes were nosocomially acquired and 10 patients had an additional pathogen, besides *Pneumococcus*, isolated from their blood samples. Patients with bacteremia had a median age of 10 m (range 1 m - 60 y), and 60% were infants <1 year of age.

Diarrhoea was present in 97% of patients (watery diarrhoea in 118 and dysentery in 34), fever in 83%, respiratory distress in 46%, and history of cough in 49% patients. Seventy-four (60%) of 124 under-5 bacteremic children were severely malnourished.

Forty-nine (31%) of the patients died, accounting for 1.8% of all hospital deaths during the study period. Seventeen percent of the isolates were resistant to penicillin. Pneumococcal bacteremia was not uncommon and was associated with a high case-fatality rate. Further, a significant proportion of pneumococci were resistant to penicillin.

Hospital Surveillance Programme

PIs: G.J. Fuchs & A.S.G. Faruque

Funded by: UNDP and WHO

More than 100,000 patients attend ICDDR,B's diarrhoea treatment centre in Dhaka each year. This Programme provides information on diarrhoeal diseases which:

- (1) are reported to the Government to assist in health policy matters;
- (2) enable the Centre to monitor the emergence of new enteric pathogens or changes in disease patterns including drug sensitivity;
- (3) provide a database to conduct epidemiological studies;
- (4) assist in identification and development of new areas of research; and
- (5) are used to improve patient care and introduce preventive care.

A systematic 2% sub-sample of all CRSC patients are enrolled into this continuous surveillance. To assess causative agents and drug sensitivity, an extensive microbiologic evaluation is done through a stool exam and stool or rectal swab culture. Patients or their guardians are interviewed by the surveillance team to obtain information on patients' socioeconomic and demographic characteristics, housing and environmental conditions, feeding practices particularly of infants and young children, and the use of

drugs and fluid therapy at home. Clinical characteristics on presentation, anthropometric measurements and the treatment and outcome of treatment received at the hospital are also recorded.

During 1996, patients enrolled in this programme totalled 2,171 (2% sample). This year's epidemic of cholera was caused mainly by *V. cholerae* O1.

The most common species of *Shigella* was *S. flexneri* (60%). The table (Page 24) shows the main etiological agents isolated from these patients.

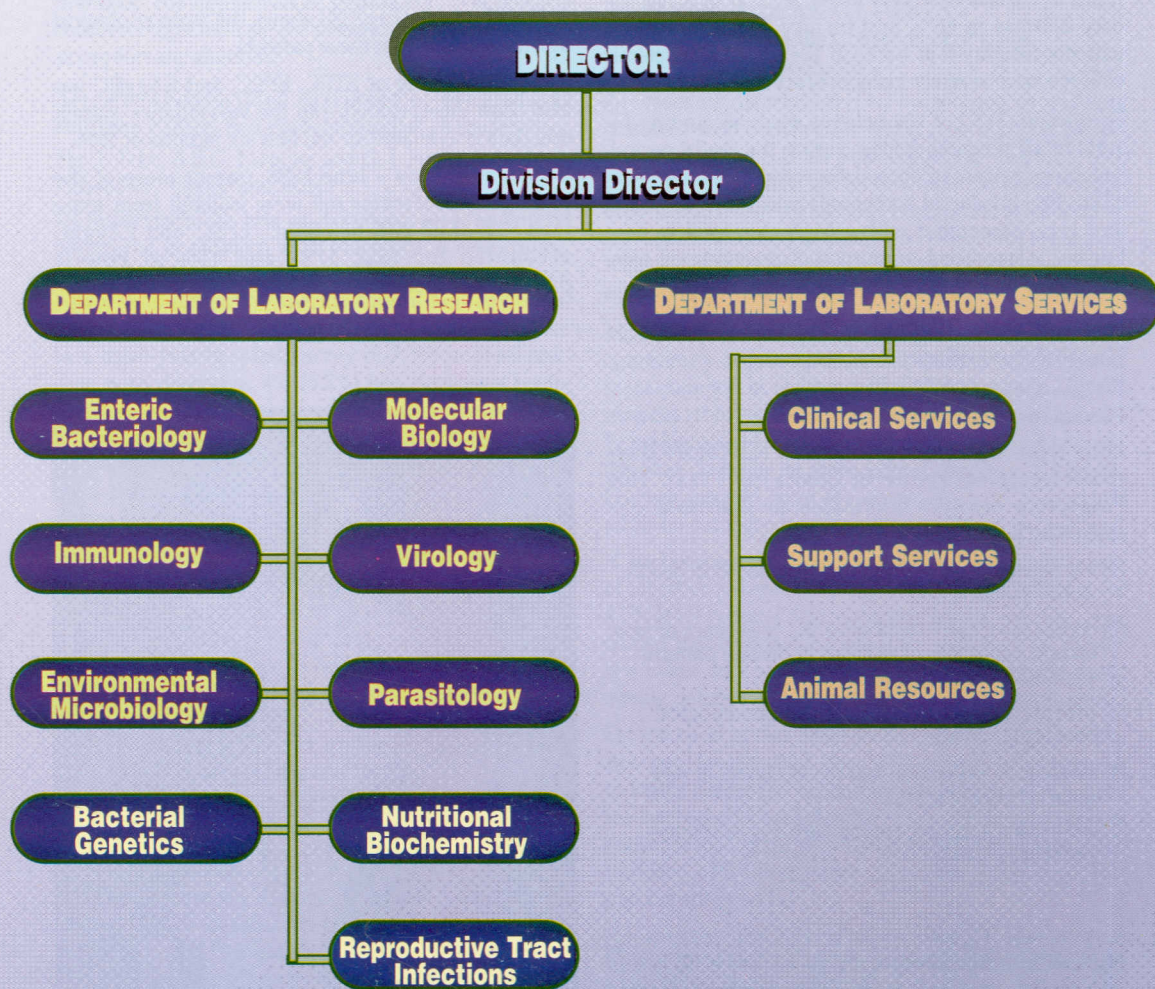
Routine screening of ETEC, EPEC, and EAaggEC has also been incorporated into the surveillance system and data is available for the first six months of 1996.

Between January - June 1996, one or more of the pathogenic *Escherichia coli* were isolated from more than 50% of all patients. ETEC, EPEC, and EAaggEC accounted for 16%, 17%, and 10% of enteric pathogens respectively.



The joy of a child's recovery is shared by doctors and mothers alike : Dr. Rukhsana Haider holds a happy baby in her arms, while the mother stands proudly by.

Laboratory Sciences Division



LSD

Laboratory Sciences Division

Acting Division Director
M. John Albert

The Laboratory Sciences Division (LSD) has numerous functions and responsibilities, which generally fall under the following four areas:

- ◆ Laboratory-based research on diarrhoea, respiratory tract infections, reproductive tract infections and nutrition-related problems;
- ◆ Diagnostic laboratory support to clinical, community, field and environmental studies undertaken by the Centre scientists;
- ◆ Diagnostic laboratory support to patients attending the Clinical Research and Service Centre (CRSC) at Dhaka, the Matlab Diarrhoea Treatment Centre (DTC) and private patients; and
- ◆ Training of postgraduate students in laboratory research and laboratory diagnostic procedures.

The research and service functions of the Division are organised into two departments: the Department of Laboratory Research, headed by Dr. M. John Albert, and the Department of Laboratory Services, headed by Dr. Mahbubur Rahman.

Between them, the two departments have a total of 3 international and 26 national-level scientists and 122 support staff.

During the year, four studies were completed and 20 are ongoing. There are currently 16 collaborative projects, both formally and informally allied with 14 overseas institutions.

Division Highlights

- ☐ In accordance with the strategic plan of the Centre, the Division initiated research activities in the areas of acute respiratory infections (ARIs) and reproductive tract infections (RTIs). To lead the activities in RTIs, Dr. Josef Bogaerts, a Belgian microbiologist, joined the Division.
- ☐ The Clinical Laboratories have started screening blood for HIV infection for safe blood transfusion and introduced a number of newer tests.
- ☐ A pulsed-field gel electrophoresis apparatus for improved molecular typing of bacteria has been put into operation in the research laboratories.

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LSD DEPARTMENT OF LABORATORY RESEARCH

Head: M. John Albert

The Department of Laboratory Research, one of the two departments of the Laboratory Sciences Division, is comprised of the following laboratories:

ENTERIC BACTERIOLOGY
IMMUNOLOGY
ENVIRONMENTAL MICROBIOLOGY
BACTERIAL GENETICS
MOLECULAR BIOLOGY
VIROLOGY
PARASITOLOGY
NUTRITIONAL BIOCHEMISTRY
and
REPRODUCTIVE TRACT INFECTIONS

The major activities of component of this Division are reflected in the descriptions of the protocols that follow:

Enteric Bacteriology Laboratory

Head: M.J. Albert

Polymerase chain reaction (PCR) assay for *V. cholerae* O139 Bengal

PIs: M. John Albert, D. Islam and F. Qadri

CI: A. Weintraub & S. Falklind,

Huddinge Hospital, Karolinska Institute, Sweden.

Funded by: The Government of Japan

A PCR assay was developed for detection of *V. cholerae* O139. The primer pair corresponded to a chromosomal region which potentially could encode two glycosyl-transferases possibly involved in capsular-polysaccharide or lipopolysaccharide biosynthesis.

The PCR assay was used to screen 180 diarrhoeal stools. All the 67 *V. cholerae* O139 culture-positive stools were positive by PCR assay. The detection limit of the assay was 1×10^5 cfu per ml of bacteria.

Production and characterisation of monoclonal antibodies to the virulence-associated antigens of enteropathogenic *Escherichia coli* (EPEC) for use as diagnostic reagents

PIs: M. John Albert, F. Qadri and T. Azim

CI: J.B. Kaper, University of Maryland, School of Medicine, Baltimore, MD, USA.

Funded by: USAID

EPEC are a major cause of diarrhoea in infants in developing countries. To develop simpler diagnostic tests, we targeted two virulence antigens of EPEC –

bundle-forming pilus (BFP) and intimin. Monoclonal antibodies have already been produced to BFP, and these have been utilised to develop an enzyme-linked immunosorbent assay (ELISA). Several EPEC isolates reacted positively in the assay.

Biochemical fingerprinting in epidemiological studies of bacterial diarrhoeal pathogens

PIs: M. John Albert, M. Ansaruzzaman and S.M. Faruque

CI: R. Möllby & I. Kuhn (Karolinska Institute, Sweden)

Funded by: SAREC, Sweden.

Aeromonas spp., *V. cholerae* O139 Bengal, enteropathogenic *Escherichia coli* (EPEC), *Hafnia alvei* and *Shigella flexneri* have been subtyped by biochemical fingerprinting. Studies with *Aeromonas* spp. suggested that human diarrhoeal isolates are more homogeneous than environmental isolates, and that clones exist that are probably pathogenic to humans.

Studies with *V. cholerae* O139 suggested that the three colony variants (fully capsulated opaque form, partially capsulated intermediate form, and non-capsulated translucent form) show different biochemical fingerprints. Virulence properties of these three variants are also different.

Studies with EPEC isolates of serogroups O114 and O127 from children with diarrhoea suggested that isolates of either serogroup were clonal because isolates belonging to the same serogroup gave identical biochemical fingerprints. In EPEC, the biochemical fingerprints correlated with RAPD-PCR.

Hafnia alvei isolated from diarrhoeal patients in Bangladesh, and *H. alvei* isolates from diarrhoeal patients, food and environment in Finland were subtyped by biochemical fingerprinting and RAPD-PCR. Two clonal groups of *H. alvei* isolates were found in Bangladesh, the Finnish isolates being more diverse. Again, there was a good correlation between the two typing methods. Studies on *S. flexneri* are in progress.

Immunology Laboratory

Head: Firdausi Qadri

The Immunology Laboratory is investigating the immune response in children and adults with diarrhoeal diseases (cholera, shigellosis, enterotoxigenic *Escherichia coli* and persistent diarrhoea).

For these purposes, systemic and mucosal, cellular and humoral responses as well as cytokines are being studied. Monoclonal antibodies to bacterial antigens are being produced and efforts are continuing for

their utilisation in rapid diagnosis. Four scientists and 6 support staff are engaged in the following protocols:

Safety and immunogenicity of an oral bivalent B-subunit *Vibrio cholerae* O1/O139 whole cell(B O1/O139 WC) vaccine in adult Bangladeshi volunteers

PIs: F. Qadri, P.K. Bardhan, R.B. Sack, M.J. Albert, A.M. Svennerholm and J. Holmgren (University of Göteborg, Sweden)

Funded by: The European Union (EU)

Studies on the oral bivalent O1/O139 whole cell plus B-subunit of cholera toxin containing cholera vaccine are ongoing. So far 36 volunteers have been recruited. A comparison is being carried out with volunteers orally immunised with the monovalent O1 cholera vaccine. A preliminary evaluation of the results obtained so far indicates that the bivalent vaccine is safe and volunteers showed little or no side-effects. The vaccine-specific antibody secreting cell (ASC) response is being studied in the blood and intestine.

Almost all vaccinees studied so far in both the bivalent and the monovalent cholera groups of vaccinees showed a two-fold or greater increase in the number of ASCs after the intake of two doses of the vaccine.

Local and systemic immune response in patients in a diarrhoeal epidemic due to *Vibrio cholerae* O139

PIs: F. Qadri, M.J. Albert, M.A. Salam, R.B. Sack, and A.M. Svennerholm (University of Göteborg)

Funded by : SAREC, Sweden

The mannose-sensitive haemagglutinin (MSHA) is a cell-associated adhesin present on strains of *Vibrio cholerae* O1 of El Tor biotype as well as in *V. cholerae* O139. The immune response to MSHA has been studied in adult patients with *V. cholerae* O1 and *V. cholerae* O139 infection. *V. cholerae* O1 patients showed MSHA-specific antibody-secreting cell responses in circulation.

Both O1 and O139 patients responded to MSHA-specific intestinal antibodies that could be detected in faecal extracts. Patients also responded significantly to MSHA-specific antibodies of IgA and IgG isotypes in plasma in convalescence. Cytokine responses in patients are also being studied. Peripheral blood mononuclear cells are being stimulated with cholera antigens such as MSHA, lipopolysaccharides (LPS) and cholera toxin (CT).

Results obtained so far indicate an increase of some cytokines, such as IL-6, IL-8 and IL-10, in cholera patients. The study is continuing and comparisons are being carried out among patients and age-matched Bangladeshi controls.

Major Achievements of the Division in 1996

- ✓ *Aeromonas* spp. organisms, which are putative agents of diarrhoea, have been characterised. The data suggest that there may be clones of *Aeromonas* spp. pathogenic to humans.
- ✓ Working with colleagues at the Huddinge Hospital, Karolinska Institute, Sweden, a polymerase chain reaction (PCR) assay has been developed for diagnosis of *Vibrio cholerae* O139 infection.
- ✓ Molecular typing of *V. cholerae* isolates suggested that the post-*V. cholerae* O139 epidemic *V. cholerae* O1 El Tor isolates constituted a new clone compared to the pre-*V. cholerae* O139 epidemic *V. cholerae* O1 El Tor isolates. This may explain the current resurgence of El Tor isolates.
- ✓ As shown previously with *V. cholerae* O1 El Tor strains, laboratory microcosm studies suggested that *V. cholerae* O139 can remain viable for up to 11 months in association with cyanobacteria. This may suggest that the ecology of both *vibrio* serogroups are similar.
- ✓ The bivalent killed oral cholera vaccine (against both O1 and O139 cholera) has been found to be safe and immunogenic in adult Bangladeshi volunteers.
- ✓ The zinc content of breastmilk of Bangladeshi mothers has been found to be low, which may partly explain the zinc deficiency found in Bangladeshi infants.

LSD Immune status of children with persistent diarrhoea

PIs: T. Azim, F. Qadri, M.A. Salam, J. Hamadani,
M.A. Wahed and L.N. Islam (University of Dhaka)
Funded by: USAID

The cause of persistent diarrhoea is not known, but a previous prospective study carried out at ICDDR,B has shown that children with depressed cell-mediated immune responses are more prone to developing persistent diarrhoea. This study, also a prospective one, was undertaken to identify any immune abnormalities that may have a role in precipitating persistent diarrhoea. For this purpose, several immunological parameters are being investigated, including lymphocyte phenotype and function, neutrophil function, immunoglobulin and cytokine levels.

Three groups of children are being enrolled: those with a history of 7+1 days of diarrhoea in whom diarrhoea resolves (acute diarrhoea), those with a similar history of diarrhoea but in whom diarrhoea persists for >14 days (persistent diarrhoea) and healthy controls. A preliminary analysis of data from 25 children with acute diarrhoea, 25 with persistent diarrhoea, and 29 healthy controls has been completed.

Results show that in children with persistent diarrhoea, the numbers of the different subsets of lymphocytes are unchanged, their *in vitro* response to mitogens is unchanged but their *in vivo* response to antigens is diminished. Neutrophil function was also found to be altered in children with persistent diarrhoea; their neutrophils showed more polarisation (early activation) with high doses of FMLP and less phagocytosis of unopsonised yeast particles.

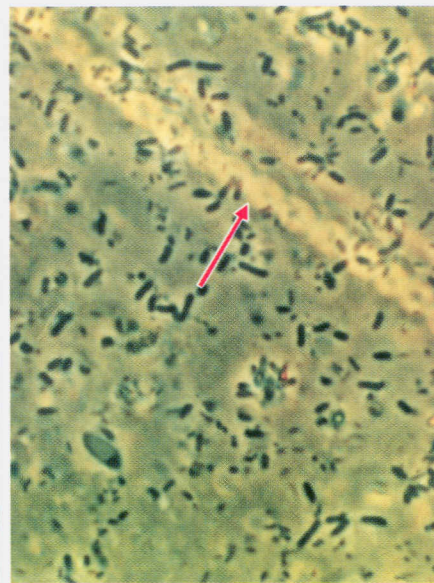
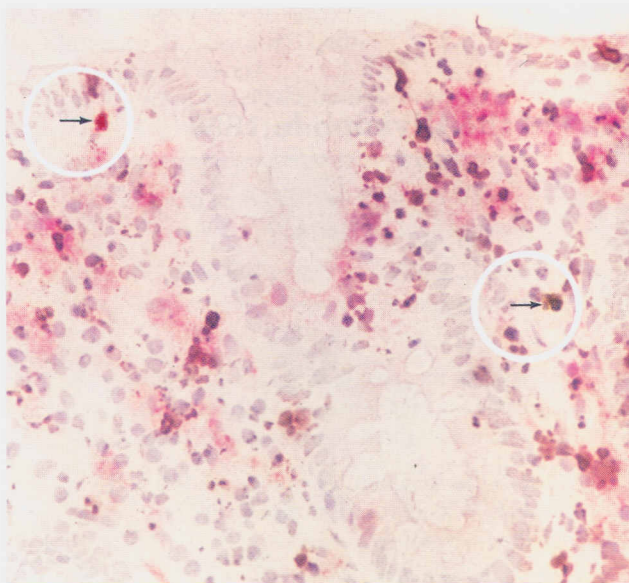
These early results show differences between some aspects of lymphocyte and neutrophil function in children with acute and persistent diarrhoea that can be detected in the acute illness phase.

Epidemiology and ecology of *Vibrio cholerae* infection in Bangladesh

PIs: F. Qadri, A.K. Siddique, M.J. Albert and R.B. Sack
(Johns Hopkins University, Baltimore, MD, USA)

Funded by: National Institutes of Health (NIH), USA

A number of monoclonal antibodies (MAbs) specific for lipopolysaccharide (LPS) of *Vibrio cholerae* O1 have been produced. Of these, one is reactive to both Ogawa and Inaba serotypes, one to Inaba and the rest to Ogawa only.



Under the microscope:

(Left) Identification of apoptotic (dead) cells in an acute-phase rectal biopsy sample from a patient with shigellosis. Apoptotic cells and bodies (brown coloured, arrow) and macrophages (red coloured) can be seen.

Phase-contrast microscopy (right) shows *V. cholerae* O1 inside the mucilaginous sheath of a cyanobacterium, *Anabaena variabilis*, which can act as a reservoir of cholera. Arrow shows a filament of *A. variabilis*.

These MAbs can detect bacteria by direct slide agglutination and by immunofluorescence and can specifically inhibit the darting movement of vibrios, a characteristic test for detection of *V. cholerae*. It is hoped that the MAbs can also be used in rapid diagnostic assays.

Further studies of systemic and local immune responses in shigellosis in order to formulate a protective vaccine

PIs: D. Islam and R. Raqib, J. Andersson,
B. Christensson & B. Wretling
(Karolinska Institute, Sweden)

Development of an efficient vaccine against shigellosis requires successful vaccine design, which in turn requires both efficient antigen presentation and specific T-cell activation. However, little is known about these mechanisms in shigellosis. Our recent studies in adults with shigellosis suggest that cell-mediated immune responses are important for local disease development as well as for recovery from the infection.

The present study focuses on identifying the antigen-specific T-cells that may provide help for both humoral and cellular immune responses in children and adults with shigellosis. Knowledge gained from the proposed project will help understand the development of protective immunity in shigellosis and thus contribute to the design of a successful vaccine.

Environmental Microbiology Laboratory

Head: Md. Sirajul Islam

The Environmental Microbiology Laboratory provides inter-departmental services for testing environmental samples supplied by the Clinical Sciences and Community Health divisions. Various environmental samples from various national and international institutions of Bangladesh are also tested in this laboratory. A total of 247 samples, including rectal swabs, stool, water, fish, soil, honey, fruit juice, beef, vegetables, etc., were tested in this laboratory during 1996.

Survey of culturable *V. cholerae*

PIs: M.S. Islam, M.J. Albert and A. Felsenstein
Funded by: Belgian Administration for Development Cooperation (BADC)

This study investigated culturable *V. cholerae* O1 and O139 in the aquatic environment of an endemic area of Bangladesh. Various environmental samples (plants, water, phytoplankton, zooplankton, snails and oysters) were collected at 15-day intervals from 4 selected sites of an endemic area of Bangladesh and tested for cholera. Samples were cultured onto TCBS and TTGA media, using standard procedures. Preliminary data

showed that *V. cholerae* non-O1 and *V. mimicus* are very common in these pond ecosystems. No culturable *V. cholerae* O1 or O139 were isolated.

Role of various aquatic flora, fauna and physico-chemical conditions of water in maintaining endemicity and seasonality of cholera in Bangladesh

PIs: M.S. Islam, M.J. Albert, A. Huq, A. Felsenstein
and Z. Rahim

Funded by: Swiss Development Cooperation (SDC).

The aim of the study is to investigate the role of various aquatic flora, fauna and physicochemical factors of water in maintaining endemicity and seasonality of cholera in Bangladesh. Various environmental samples e.g. plant, water, phytoplankton, zooplankton, snails, oysters, etc., are collected at 15-day intervals from 4 closed-water systems in Matlab, Bangladesh.

The culturable and non-culturable *V. cholerae* O1 and O139 were detected using PCR, FA and conventional culturable techniques. Various physicochemical parameters of water such as pH, temperature, salinity, etc., are also routinely monitored. The preliminary data show that *V. cholerae* O1 and O139 were associated with various components of the aquatic environment in viable but non-culturable (VBNC) form. The abundance of VBNC *cholerae* O1 and O139 was always higher in plankton samples than in water.

Epidemiology and ecology of *V. cholerae* in Bangladesh

PIs: M.S. Islam, A.K. Siddique, M. Yunus,
M.J. Albert, A. Huq, R.R. Colwell and R.B. Sack
Funded by: National Institutes of Health (NIH), USA

This protocol officially started in June 1996. Groundwork for initiating field sampling started in January 1997.

Bacterial Genetics Laboratory

Head: Zia U. Ahmed

The Bacterial Genetics Laboratory was primarily involved for the first few months of the year with the study of live cholera vaccines in rabbits:

Colonisation and protective efficacy of attenuated live oral cholera candidate vaccines in rabbit RITARD model

PIs: Zia U. Ahmed & R. B. Sack
Funded by: WHO

This study of the colonisation potential and protective efficacy of live oral candidate vaccine strains of *Vibrio cholerae* in rabbit RITARD model was completed in

LSD March 1996. Concomitantly, an exploratory study of a novel hemolytic activity in *Shigella*, which was undertaken in collaboration with Dennis J. Kopecko of USFDA, yielded some interesting preliminary results – with some strains giving strong haemolytic reactions with certain types of erythrocytes.

Molecular Biology Laboratory

Head: Shah M. Faruque

The Molecular Genetics Laboratory conducts research in the development and application of molecular techniques to identify and characterise diarrhoeagenic organisms. The technical facilities available in this laboratory range from gel electrophoresis, nucleic acid preparation, hybridisations using both radio-labelled and non-radioactive probes to the sophisticated techniques of DNA sequencing, oligonucleotide synthesis and DNA amplification by polymerase chain reaction (PCR).

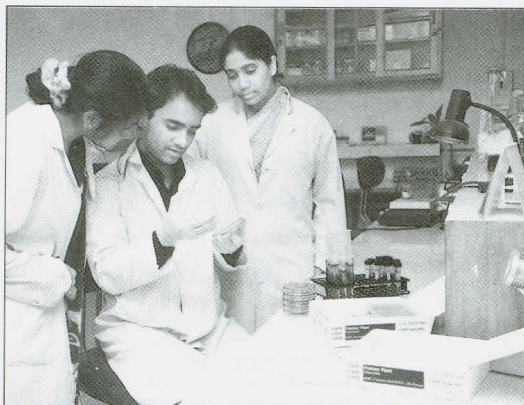
Recent diagnostic techniques routinely used include DNA probe assays of genetic fingerprinting of pathogenic bacteria as an aid to epidemiological studies, and PCR assays for rapid identification of diarrhoeal pathogens. This laboratory actively collaborates with the Public Health and Clinical Sciences divisions in materializing research protocols.

Identification of enteric pathogens in biological specimens by specific DNA amplification

PIs: S.M.Faruque, A.R.M.A. Alim, Q.S. Ahmad and M.J. Albert

Funded by: USAID

This study employs the polymerase chain reaction (PCR) to amplify specific segments of pathogenic genes and thus identify the enteric pathogen. The aim is to develop and standardise rapid and sensitive



Researchers study STDs at the RTI Laboratory.

diagnostic techniques for different enteric pathogens and test the applicability of these techniques in clinical and epidemiological studies. PCR assays have been standardised for various enteric pathogens, including *Shigella*, different categories of diarrhoeagenic *E. coli* and toxigenic *cholerae* O1 and O139 strains.

PCR assays based on the amplification of intergenic spacer region of RNA genes have provided a rapid technique for differentiating among strains of enteric pathogens. Development and evaluation of multiplex PCR assays are in progress.

Characterisation of epidemic strains of *Vibrio cholerae* O1 and non-O1, based on genetic and phenotypic traits

PIs: S.M. Faruque, A.K. Siddique, A.R.M.A. Alim, Q.S. Ahmad and M. J. Albert

Funded by: USAID

The aim of the study is to characterise epidemic strains of *Vibrio cholerae*, based on genetic and phenotypic characteristics, in Bangladesh and other countries.

Toxigenic *V. cholerae* strains were collected from various regions of the world during epidemic or inter-epidemic periods and are being analyzed to study their genetic relatedness and their contribution to cholera epidemics.

The development of a numerical ribotyping scheme has facilitated studies on the molecular epidemiology of *V. cholerae*. Further studies are under way to determine possible genetic and phenotypic differences among epidemic strains and toxigenic strains collected during inter-epidemic periods.

Studies so far indicate that some clones of toxigenic *V. cholerae* are more associated with epidemics whereas a greater number of toxigenic clones not associated with epidemic cholera can cause sporadic cases of cholera.

The epidemic strains can be differentiated from non-epidemic strains by genetic fingerprinting. Recent data also confirmed the emergence of a new clone of El Tor *vibriosis* that is displacing *V. cholerae* O139 Bengal in Bangladesh.

Epidemiology and ecology of *Vibrio cholerae* infections in Bangladesh

PIs: S.M. Faruque, A.R.M.A. Alim, K.M. Ahmed, A.K. Siddique, M.J. Albert, and R.B. Sack (Johns Hopkins University, Baltimore, MD, USA)

Funded by: National Institutes of Health (NIH), USA

Toxigenic *V. cholerae* strains isolated from various components of the aquatic ecosystem and from cholera patients are being analyzed to study their genetic

relatedness and their contribution to cholera epidemics. The aim of the study is to build a model to explain the general epidemiologic behaviour of cholera and to develop criteria to be able to predict epidemics.

Virology Laboratory

Head: Leanne Unicomb

The Virology Laboratory has been involved in studies on the viral aetiology of diarrhoea with particular emphasis on studies of group A rotavirus

The laboratory performs surveillance and characterisation of rotavirus strains in preparation for the testing of rotavirus candidate vaccines. The laboratory also provides research support for the study of respiratory viruses, measles virus and polio virus in collaboration with other scientific divisions of ICDDR,B.

Surveillance of group A rotavirus G and P serotypes in Bangladesh

PIs: L. Unicomb & G. Gentsch (CDC, Atlanta, USA)

Funded by: Core funds

Group A rotavirus-positive stool samples from the surveillance system of the Clinical Research and Service Centre (CRSC) and from the Matlab Clinical Research Centre were analyzed for dual serotypes.

Using a combination of enzyme immunoassay and reverse-transcriptase-PCR, approximately 300 samples dating as far back as 1987 were analyzed, the most common type being G4P8. Unusual strains of type G9P6, which have a neonatal P type, were recently found in both Dhaka and Matlab.

Characterisation of type G4 group A rotavirus variants

PIs: L. Unicomb, and G. Gentsch

(CDC, Atlanta, USA)

Funded by: Core funds

Different sets of monoclonal antibodies were used to determine the G types of rotavirus strains from 1987 to 1996, and it was found that most (81%) strains of type G4 were reactive with only one monoclonal antibody (non-reactive), unlike the strains from 1985 and 1986, of which only 2% were non-reactive.

These findings suggest that antigenic drift may have occurred. Since type G4 (P8) is epidemiologically the most important in Bangladesh, experiments examining the antibody responses of 11 children infected with the non-reactive strain were performed.

Of the 11, three did not respond to any rotavirus strain, a further 3 responded to both reactive and non-

reactive strains, 4 responded to the non-reactive strain only and 1 to the reactive strain only. These results suggest that G4 rotaviruses have undergone antigenic changes that can reduce production of antibodies to the standard type G4 (reactive) strain.

Association of astrovirus with persistent diarrhoea

PIs: L. Unicomb, N. Nahar Banu, T. Azim, A. Islam,

P.K. Bardhan, A.S.G. Faruque, M.J. Albert

(ICDDR,B), C. Moe (University of North Carolina, Chapel Hill, NC, USA), and Andrew Hall (Oxford University, Oxford, UK)

Funded by: Core funds

Stool specimens from under-5 children with acute (<13 days duration) and persistent diarrhoea (>14 days' duration) were tested for the presence of astrovirus.

The acute diarrhoea patients were divided into two groups, based on duration of diarrhoea at the time that the specimen was collected: 1-5 days' duration (Group 1) and 6-13 days' duration (Group 2). Likewise, the persistent diarrhoea patients were divided into two groups: specimen collected at 6-8 days' duration (Group 3) and specimen collected on or after 14 days' duration (Group 4). The astrovirus detection rate increased significantly with increased duration of diarrhoea (i.e. from Group 1 to 4, from 2.1% to 17.2%), suggesting an involvement of astrovirus with persistent diarrhoea.

Parasitology Laboratory

Head: Rashidul Haque

The Parasitology Laboratory continues to work on the diagnosis and epidemiology of amoebic infections in collaboration with the University of Virginia, USA, and the London School of Hygiene and Tropical Medicine (LSHTM).

Apart from studies on *E. histolytica* infection, a significantly underestimated problem, a new area of interest of the laboratory is helminthic infection and micronutrient deficiency.

Rapid diagnosis of pathogenic *Entamoeba histolytica*

PI: Rashidul Haque

Funded by: The University of Virginia and WHO

The study evaluated the commercially produced antigen detection kits (TechLab *Entamoeba* and *E. histolytica*), designed to rapidly detect and differentiate *E. histolytica* from *E. dispar* in stool – using monoclonal antibodies specific for the *E. histolytica* lectin.

LSD The prevalence of infection by the invasive parasite *E. histolytica* and the non-invasive parasite *E. dispar* was determined in Bangladesh in 1,049 urban children with diarrhoea and in 987 asymptomatic rural children.

E. histolytica and *E. dispar* were differentiated by isoenzyme (zymodeme) analysis and by *E. histolytica*-specific monoclonal antibodies. Of the asymptomatic children, 7.0% had *E. dispar* and 1.0% had *E. histolytica* infection, while 6.5% of children with diarrhoea had *E. dispar* and 4.2% had *E. histolytica* infection, as determined by antigen detection.

Field evaluation and further characterisation of a pathogen-specific monoclonal antibody against *E. histolytica*

PIs: Rashidul Haque & David Warhurst (London School of Hygiene and Tropical Medicine)

Funded by: LSHTM - CEC (Commission for European Communities).

The study tests the applicability of a recently developed polymerase chain reaction solution hybridisation enzyme-linked immunosorbent assay (PCR-SHELA) for the differential diagnosis of *E. histolytica* and *E. dispar* and to study the epidemiology of amoebic infection. The PCR assay has been adopted for use with stool samples from patients infected with amoebic infections.

Preliminary results show that this assay will be a suitable molecular assay for detection and differentiation of *E. histolytica* from *E. dispar*. Evaluation of this assay will be extended to a large number of samples positive for *E. histolytica* and *E. dispar* infections.

Field trial of β -carotene and anti-helminthic therapy to improve micronutrient nutriture among preschoolers in Bangladesh

PIs: Rashidul Haque, M.A. Wahed and M.J. Albert
Funded by: The Thrasher Research Fund

The major objective of the study is to examine the separate and combined impacts of low-dose β -carotene supplementation and anti-helminthic therapy on the vitamin A status and physical growth of preschool children in Bangladesh.

Screening of children aged 2-5 years for intestinal helminthic infections has just been completed for interventions as planned in the study. Stool samples from 850 children have been examined for quantitative estimation of parasite load. A total of 260 children have been selected for a placebo-controlled trial with four treatment groups according to the study design.

Nutritional Biochemistry Laboratory

Head: M.A. Wahed

The major goals of the laboratory are to support various research projects, conduct research and undertake development and training activities.

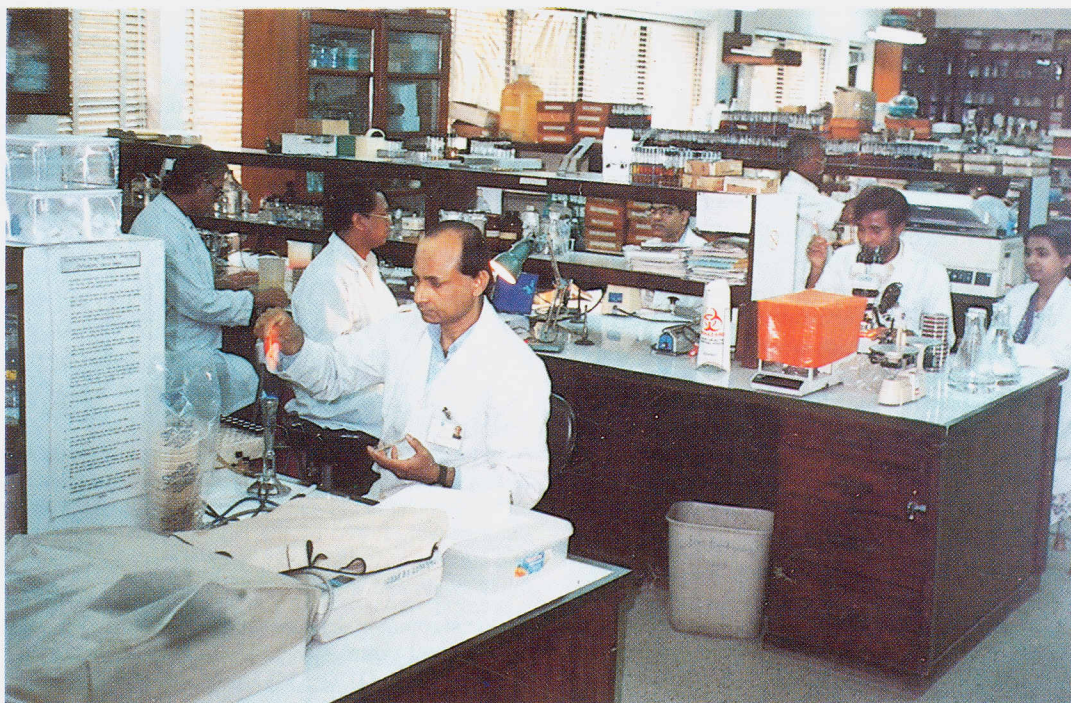
Research support

As many as 23 research projects of the Centre received services from this laboratory during 1996 and a total of 9,926 special tests were conducted.

Vitamin A₁ and A₂ were assayed on 476 serum samples and retinol on 952 breastmilk specimens for the All India Institute of Medical Sciences, New Delhi, for a multicentre study. Serum retinol was assayed on 36 samples from the Bangladesh Institute of Research and Training on Applied Nutrition.

Development, improvement and collaboration:

- * A technique was developed, using HPLC, for simultaneous determination of retinol, β -carotene and lutein.
- * In addition to in-house internal quality control measure for each and every test, the laboratory continues to participate in the quality assurance programme run by the National Institute of Standards and Technology, Washington, USA. Performance in vitamin A analysis was, as usual, rated good.
- * Collaboration with the University of Alabama, Birmingham (UAB) has continued. Laboratory analyses of samples collected for a pilot study "Effect of recurrent infections on vitamin A status in children with adequate vitamin A stores" were completed and data analyses are under way at UAB.
- * Collaboration with the Johns Hopkins University to support a Ph.D. student's project, "Effect of retinol and β -carotene supplementation in lactating mothers on breastmilk quality and vitamin A status in infants," was completed in 1996. About 800 breastmilk samples were analysed for retinol. Expressing vitamin A as a ratio to milk fat appears to be adequate to control sampling-induced variation. Casual collection appears to be appropriate for use in population studies, provided fat content is controlled.
- * A food composition database has been initiated in collaboration with the Human Nutrition Department of Wageningen Agricultural University (WAB). Two Master's degree students are working on this. The computerised table will start with dietary information collected from another study "Effect of zinc supplementation during pregnancy on infant birth weight, growth, morbidity and response to BCG."



Scientists at work in LSD's Enteric Bacteriology Laboratory.

Local institutions (INFS, IPHN, BIRTAN, BARC, HKI, NNC) were contacted for available information and possible collaboration.

Research:

Liver stores of vitamin A in children dying in the intensive care unit of the Centre's Dhaka hospital

PIs: M.A. Wahed & A.K. Azad

Funded by : USAID

A study was carried out on children who died at the intensive care unit of the Dhaka hospital of ICDDR,B. So far 17 liver specimens have been collected. Vitamin A in liver specimen and in serum was measured using HPLC. Children were in the age group of 1-96 months (mean 19.5), 95% of the children were severely malnourished (<60% wt/age NCHS std.) and the rest were mildly malnourished.

Nine children had liver vitamin A <10 µg/g and only 3 had sufficient liver stores (>20 µg/g). Serum samples could be collected from 15 children on the day preceding their death and 12 of them had a serum retinol level of 10 µg/dl. Only one child had >20 µg/dl. These findings suggest that these children had inadequate vitamin A liver stores.

Laboratory of Reproductive Tract Infections

Head: J. Bogaerts

Created in 1996 as a new entity within the Department of Laboratory Research, this laboratory is dedicated to epidemiological research in the Reproductive Tract Infection (RTI) field. It will also provide technical support to protocols being developed in other scientific divisions of the Centre, provide training in diagnostic procedures and also provide diagnostic support for patient care.

Laboratory-based work will consist of a monitoring programme for the *in vitro* susceptibility of *Neisseria gonorrhoeae* and the study of the prevalence and aetiology of RTIs in "commercial sex workers" (CSWs) and other high-risk groups, including the study of HIV infections and the aetiology of genital ulceration and asymptomatic carriage of *H. ducreyi*.

The prevalence and aetiology of reproductive tract infections among women attending the Bangladesh Women's Health Coalition (BWHC) clinic in Mirpur

PIs: J. Bogaerts, J. Ahmed, N. Akhter and N. Begum

Although Reproductive Tract Infections (RTIs) and Sexually Transmitted Infections (STIs) are thought to

be very common among women attending health care facilities in Dhaka, little is known about the prevalence and aetiology of these health problems. The aim of this study is to provide more appropriate treatment to patients through a better understanding of the aetiology of RTIs and to strengthen BHC's management of RTIs. Detection of HIV antibodies, using the unlinked anonymous testing method, is also planned.

The study started in June 1996 among a representative group of women attending BHC's clinic in Mirpur, Dhaka. The women are interviewed and undergo a clinical examination and laboratory tests for *N. gonorrhoeae*, *C. trachomatis*, *T. vaginalis*, *T. pallidum* and yeast infections. Preliminary data show a 1% prevalence of gonorrhoea, syphilis and *C. trachomatis* infection and less than 1% of trichomoniasis.

DEPARTMENT OF LABORATORY SERVICES

Head: Mahbubur Rahman

The Department of Laboratory Services includes the clinical laboratories (Clinical Microbiology, Clinical Pathology, Clinical Biochemistry and Histopathology), Animal Resources, Laboratory Support Section, Bioengineering Cell and the rural Matlab Diagnostic Laboratory.

This Department provides laboratory support to clinical, community and field studies undertaken by the Centre's scientists and provides diagnostic laboratory services to patients attending the Clinical Research and Service Centre (CRSC) at Dhaka, the Matlab Diarrhoea Treatment Centre (DTC), the Staff Clinic, Travellers' Clinic and private (paying) patients.

Besides carrying out methodological and applied (clinical) research, the department also provides training to national and international fellows, and to graduate and postgraduate students in laboratory research and laboratory diagnostic procedures.

Clinical Microbiology Laboratory

Head: Mahbubur Rahman

The major accomplishment of the Clinical Microbiology Laboratory during 1996 was the adoption of a new classification scheme for the detection of *Staphylococcus* species from clinical samples. An analysis of microbiological data was performed to study different isolates (pathogens) obtained during the past four years. Antimicrobial resistance, its pattern and changes among *Vibrio* spp., *Salmonella typhi*, *Shigella* spp., *Streptococcus pneumoniae*, *Staphylococcus* spp., and blood and urinary isolates were analyzed thoroughly.

The mechanism of antimicrobial resistance was studied among multi-resistant *Salmonella* spp. and *Vibrio cholerae* isolates.

During 1996 the laboratory supported 28 research protocols and collaborated with the University of Dhaka (Profs. Saleh Mahmood, Department of Biochemistry and Joseph de Silva, Department of Zoology) through research work by graduate students on salmonella, staphylococcus and diarrhoeal protozoa. Field support was also given to HPED's Epidemic Control Team to investigate the *V. cholerae* O1 diarrhoea (cholera) epidemic in different parts of the country.

A total of 54 (10%) of 540 rectal swabs collected by the Epidemic Control Team were positive for *V. cholerae* O1 and 8 (1.5%) were positive for *V. cholerae* O139.

New protocols were also adopted for optimum isolation and identification of new species/serotypes of different bacterial pathogens. More than 42,150 clinical samples were tested by the laboratory during 1996. The samples included blood, stool, rectal swabs, urine, throat swabs and sputum.

The most common diarrhoeal pathogens isolated from 20,115 faecal samples included *Shigella* spp. (1,650), *Vibrio cholerae* O1 (1,635), *Aeromonas* spp. (980), *Salmonella* spp. (865), *Campylobacter* spp. (111 from 2,569 faecal samples) and *Plesiomonas* sp. (153). The most common blood isolate was *S. typhi*.

Clinical Pathology Laboratory

Head: Md. Anwar Hossain

The activities of the Clinical Pathology Laboratory include diagnostic support for patient-care activities for the Clinical Research and Service Centre (CRSC), the Staff Clinic, Travellers' Clinic and cases referred by national hospitals and private clinics (paying users).

The laboratory also provides support to research protocols, training for in-house staff, and national and international fellows; and conducts research on diarrhoeal disease agents and methodology development. It also provides technical support to the Centre's specimen reception area.

In 1996 the laboratory performed 120,465 tests of various parameters on 64,625 specimens of blood, serum, plasma, stool, urine, CSF, etc., producing 12,68,304 Workload Units (WLUs) in 22,560 work hours with a general index of 56.21 WLUs per person-hour. In addition to routine blood tests, coagulation tests, blood grouping and crossmatching, serological test profiles – particularly 10 hepatitis markers and 3 cancer markers – have been adopted.

Among the major accomplishments of the year was the adoption of a full panel of hepatitis markers and cancer markers using a software-based Microplate ELISA reader, and – since August 22 – initiation of screening of blood for HIV-1 and 2, HBsAg, VDRL, TPHA and malarial parasites before blood transfusion.

The laboratory continues its participation in the Quality Assurance Scheme (QAS) of the College of American Pathologists (CAP) in routine haematology, limited coagulation and in parasitology. Performance has been rated within the acceptable target value (95% of confidence interval) with 100% in parasitology.

The most common parasites detected from stool samples were *Giardia lamblia*, *E. histolytica*, *E. nana*, *T. hominis* and *Cryptosporidium* spp. *Fasciola hepatica* and those from blood were malarial parasites of both *P. vivax* and *P. falciparum*, *Babesia* spp., *Trypanosoma cruzi*, *Schistosoma mansoni*, etc.

This laboratory participated in supporting one international training course on laboratory diagnosis of common diarrhoeal agents, provided laboratory orientation to 3 SAARC fellows and one fellow from Germany, trained 7 physicians and 7 technicians from the Family Planning Association of Bangladesh, 2 physicians from the Savar Gonoshashthya Kendra and one technician from Concerned Women for Family Planning.

The laboratory supported 15 research protocols during the year. One paper was published and one was submitted. As a part of collaboration, the laboratory collected and stored serum specimens for surveillance of HIV-1 seropositivity in Bangladeshi children with diarrhoea and malnutrition. Also, one student from the Department of Zoology, University of Dhaka, worked in the parasitology unit for her M.Sc. thesis.

A refrigerator for the storage of blood bags was purchased and a centrifuge machine for cross-matching was ordered. A haematology analyzer (Auto-Counter) is to be purchased in 1997 and, as the requests for hepatitis markers and ELISA techniques are increasing, manual washing is to be replaced by an automated microplate washing system. One hot-air drier is to be replaced and the purchase of an incubator for all-purpose serological tests is being contemplated.

As in the past, improvements in laboratory methodology and adaptation of new techniques and test methods will continue. Mycodot for TB antibody, antibody for TORCH (Cytomegalovirus, Rubella, Toxoplasma, and Herpes) and more coagulation profiles will also be adopted in future.

Clinical Biochemistry Laboratory

Head: Ashish Kumar Choudhury

The Clinical Biochemistry Laboratory provides diagnostic and training services similar to those provided by other laboratories of the Division. It supports research protocols, conducts research on methodology development, undertakes quality assurance programmes both internally and externally, provides support for the specimen reception area in collecting specimens and drawing blood. It also provides technical support to the Institute of Public Health (IPH), Dhaka.

During 1996 the laboratory performed 115,370 tests of various parameters on 30,487 specimens of blood, serum, plasma, stool, urine, cerebrospinal fluid, intravenous fluid (IVF), ORS, etc. The number of specimens from paying cases was 15,704, which was about 51.5% of the total specimens tested.

The laboratory continued its support to IPH for the quality control of IVF for electrolytes, glucose and pH. A total of five different thyroid hormone tests were introduced during the period. Twenty-one research protocols were supported during 1996. Nine national and international fellows were provided training/orientation for a period ranging from two days to four weeks.

The laboratory has continued to participate in the international External Quality Assessment Scheme (EQAS) conducted by the Queen Elizabeth Hospital, Birmingham, U.K. The Overall Mean Running Variance Index Scores (OMRVIS) of this laboratory varied between 45 and 61, indicating a Grade-1 standard. Internal quality assurance procedures are being continued as before.

Five thyroid hormones – triiodo thyronine (T_3) thyroxine (T_4), thyroid-stimulating hormone (TSH), free triiodothyronine (FT_3) and free thyroxine (FT_4) from serum – were introduced in 1996 to enhance income-generating potential. Also, some new tests such as Nitrate, TBARS, TRAP, GSH, GSSG, Sucrose and Lactose were introduced for collaborative protocols with the Clinical Sciences Division (CSD).

New test methodologies such as reproductive hormones (prolactin, testosterone, LH, FSH and HCG) and Hb_{1c} from serum and VMA from urine are to be introduced in 1997.

The cost of test parameters (both automated and manual) was reviewed and recalculated in order to modify/reduce test charges for both external and internal cases. These revised charges were implemented from January 1, 1997. The laboratory procedure manual for both automated and manual tech-

LSD

niques was completely revised and rewritten in 1996. Seven officers from the Armed Forces Medical Institute were provided orientation on basic laboratory techniques. One person from IPGMR's Nephrology Department, was trained for a week on operational and quality-control aspects of the synchro-EL-1SE 4-channel electrolyte analyzer. One technician from Concerned Women for Family Planning (CWFP) was trained in biochemical techniques.

Histopathology Laboratory

Acting Head: A.K. Azad

The branch is currently supporting three LSD protocols on the gut mucosal immune response on oral cholera vaccination and on shigellosis.

Post-mortems

Funded by: UNDP and WHO

Data were analyzed from autopsies carried out at ICDDR,B and manuscripts were prepared. The pathologic findings in children hospitalised with persistent diarrhoea and a fatal outcome were recorded.

These reveal that small intestinal mucosal damage of varied aetiology was the underlying cause of their persistent diarrhoeal illness. Monthly clinico-pathologic conferences on selected cases were conducted at ICDDR,B to highlight the salient pathologic findings.

Matlab Laboratory

Manager: Q. Shafi Ahmad

The Clinical Microbiology and Clinical Pathology units of the section perform tests on stool, blood, urine and other samples collected mainly from the hospital patients. Facilities are available to provide a number of individual tests such as culture and sensitivity tests, routine examination of stool, urine, serum electrolyte, glucose, urea, creatinine, TC, DC, ESR, etc..

During 1996 the Microbiology Unit performed 7,200 tests including culture, antimicrobial sensitivity and dark-field examination for *V. cholerae*. The Clinical Pathology and Haematology units performed 11,460 individual tests.

During 1996, attempts were made to improve the service quality of Matlab Laboratory and steps were taken to streamline the Matlab operation. In order to meet the increased need of laboratory tests for patient care, the range of tests has been expanded.

Internal quality control assessment in the Microbiology Laboratory at Matlab has been started on a monthly basis. A committee formed with senior

LSD and PHSD staff meets monthly at Matlab to review the activities of the Matlab Laboratory and matters related to the problems and development of the laboratory.

During the year, the Matlab Laboratory performed 20,584 tests, of which 11,460 were biochemical and pathological tests on blood, stool and urine. Culture and sensitivity of rectal swab, stool and enrichment accounted for 7,190 tests and 1,018 tests were performed for microbial sensitivity. Culture of blood, urine, throat swabs, CSFs, etc. accounted for 918 of the tests.

MATLAB FIELD LABORATORY

Total number of positive isolations

Organism	Serotype	Number	Percentage
<i>V. cholerae</i> Classical	Inaba	0	0
	Ogawa	0	0
<i>V. cholerae</i> El-Tor	Inaba	141	12.5
	Ogawa	323	28.5
<i>V. cholerae</i>	O139	91	8.0
<i>Vibrio</i> species	Non-O1, non-O139 & others	73	6.4
<i>S. dysenteriae</i>		104	9.2
<i>S. flexneri</i>		158	14.0
Other <i>Shigella</i> species		20	1.8
<i>Salmonella</i> typhi		19	1.7
Other <i>Salmonella</i>		23	2.0
Other pathogens from blood, urine, throat swabs, etc.		180	15.9
Total		1,132	

Outpatient Service Project

Head : Mahbubur Rahman

The Centre's Outpatient Service Project in Dhaka handles specimens from the Clinical Research and Service Centre (CRSC) and the Staff and Travellers' clinics – as well as from outside paying users.

It provides a wide range of services to laboratory users – from registration and computer preparation of appropriate laboratory forms to drawing of blood from paying cases, cash handling and report delivery.

The section handled a total of 138,512 specimens and collected more than 19,681 blood samples in 1996.

Surveillance and associated studies of antimicrobial resistance in *Streptococcus pneumoniae* and *Haemophilus influenzae* in children

PIs: Mahbubur Rahman & Samir Kumar Saha
(Dhaka Shishu Hospital)

Funded by: The Government of Bangladesh
and the World Bank

(A collaborative study with the Dhaka Shishu Hospital.)

Acute Respiratory Infection (ARI) is an important cause of morbidity and mortality in children throughout the world. Antimicrobial agents such as amoxycillin, co-trimoxazole and procaine penicillin are recommended by WHO for therapy of pneumonia commonly caused by *S. pneumoniae* and *H. influenzae*. In Bangladesh, co-trimoxazole is the agent for ALRI recommended by the national ARI Control Programme.

The recent emergence of resistance to antimicrobial agents in *S. pneumoniae* and *H. influenzae* threatens the success of the case management approach. In response, the WHO programme for the control of ARI developed a method of surveillance for antimicrobial resistance in these pathogens and has recommended its incorporation into the National Programme.

The objectives of the study are to develop WHO-recommended methods for surveillance for resistance in Bangladesh and to develop simplified methods that could be applied in subsequent surveillance activities in Bangladesh and elsewhere.

A prevalence study of selected sexually transmitted diseases and associated risk factors in urban slum dwellers in Dhaka

PIs: K. Sabin & Mahbubur Rahman

Funded by: The Royal Netherlands Government

(A collaborative study with the Health and Population Extension Division.)

This cross-sectional study aims at determining the prevalence of syphilis, gonorrhoea, hepatitis B, and chlamydial and trichomonal infections in women and men in an urban slum dwelling population of Dhaka city.

The information will be used to determine the extent of need for STD screening and treatment in a community maternal and child health and family planning project. Demographic and psycho-sexual information and clinical samples (blood and urine) were collected from 15,000 cases.

One important aspect of this study is the detection of *Neisseria gonorrhoeae* and *Chlamydia trachomatis* from urine samples by using a multiplex polymerase chain reaction (PCR). Data are presently being analysed and laboratory tests are being performed.

It is expected that the study will generate valuable information on this very important topic of reproductive tract infections. This study will also provide an opportunity to establish PCR as a diagnostic test in the Clinical Microbiology Laboratory.

Logistics Support Branch

Manager: Q.S. Ahmed

The Logistics Support Branch is comprised of two sections: Media Preparation-Decontamination and Bacterial Stock Culture Collection. During the year this branch provided support to 25 different research projects as well as clinical laboratories of Dhaka and Matlab. It supplied distilled water and various culture media for the growth and identification of microorganisms. The media section prepared 168,364 culture plates and 805 litre of various culture broths. Quality control tests were performed on basic media.

The Bacterial Stock Culture Collection section supported 8 research projects by lyophilizing samples ranging from 0.2ml to 500ml. During the year, 1,887 bacterial strains of various serotypes were lyophilised, 150 stock cultures were retrieved and 100 lyophilised cultures were delivered.

A large number of *Haemophilus* and *pneumococcus* strains isolated at the Dhaka Shishu Hospital were lyophilised. Similar services were provided to the Institute of Public Health and to the University of Dhaka. The branch has also participated in international training courses held at the Centre on diarrhoeal disease agents.

Bioengineering Cell

Head: S.S. Huq

The Bioengineering Cell (BEC) plays a vital role in installation, maintenance and repair of bio-medical equipment for LSD and other divisions of the Centre.

The responsibilities of BEC are: installation of new equipment, routine maintenance of all the analytical clinical equipment including newly acquired, highly sophisticated equipment, and calibration of all equipment to the desired level of performance.

This year BEC installed 11 pieces of new equipment and, in addition to some major repair work, salvaged some old equipment. BEC also completed instrumental setups for various experiments on Pulse Field Electrophoresis and DNA synthesiser, using indigenous technology.

At the recommendation of the LSD Review Committee, the procurement of measuring equipment is under way along with the procurement of new analytical and

LSD

diagnostic equipment. Besides trouble-shooting problems encountered by the users of all equipment at the Centre, BEC also modifies equipment in case of non-availability of spares or in the case of major breakdowns. It also tries to fabricate some laboratory spares/equipment in order to avoid total dependence on overseas import. As part of its assistance to national institutions, BEC helps various institutions such as IPGMR, NEMEW, IEDCR and IPH to solve technical problems and also imparts training.

Managerial and Technical Support Branch

Head: M.A. Ali

This branch assists in better and quality laboratory operating management, facilitates research and support activities and implements safety measures at the Centre. During 1996 the branch assisted and provided technical support to introduce two new techniques: DNA synthesis and pulse field electrophoresis in the Laboratory Sciences Division; provided technical support to initiate the protocol "Sexually transmitted diseases (STDs)"; raised 185 overseas requisitions and maintained liaison between Maintenance, Supply, Finance and other administrative branches.

It also trained 75 personnel of the Matlab Hospital in housekeeping, identification and disposal of biohazards and personal protection; and recommended improvements of some safety aspects at the laboratory.

The branch also conducted a training lecture on "Laboratory Safety" in the International Training Course organised by the Training and Education Department; and organised fire-fighting training at the Centre involving participation of a total of 250 Centre staff, in collaboration with the Fire Brigade. The Branch helped improve the Centre's warehouse cum store; helped provide an "Emergency Exit" in the Sasakawa Auditorium; procured some safety equipment; and continued monitoring water quality.

In the coming year, the Safety Committee plans to install the first phase of an "auto-fire-fighting system" · develop a low-cost, effective system for sewage treatment; and strengthen the "Universal Precaution" programme at the Centre's laboratories and hospitals. Other plans for 1997 include vaccination of staff at risk against hepatitis B; increasing safety awareness among personnel both in Dhaka and in Matlab; construction of additional storage area for solid radio-isotope wastes; improvement and refixation of hazardous electric wiring in different laboratories; preparation of a manual on occupational exposure to blood and potentially infectious materials.

Archives Unit

Head: M.A. Malek

The Archives Unit plays a vital role in research for the Centre. Using archived data for research purposes and future reference for the scientists and researchers both at home and abroad, the unit acts as a databank and also provides routine support by computerising data for the Dhaka and Matlab treatment centres and laboratories and performing data entry/verification, coding, editing, data cleaning and data processing.

During 1996 the Unit processed 118,939 records – mainly for the Microbiology, Pathology and Clinical Biochemistry laboratories in Dhaka and Matlab – as shown below. About 12,000 records are added each month to the existing database of 1,096,639 records.

The unit produces monthly financial recovery reports for the Clinical Laboratory, Dhaka Treatment Centre, Traveller's Clinic, Staff Clinic, private patients (paying cases) and media preparation. It also provides monthly blood culture reports, *Shigella*-sensitivity reports and isolation reports of organisms.

This Unit produces a weekly surveillance report on major diarrhoea pathogens isolated from the stool/rectal swab samples collected from the surveillance patients attending the Dhaka hospital and also provides support for data analysis, data management

Data entry/verification and data processing status (Archives Unit) January – December 1996

Form	Dhaka	Matlab	Total
Microbiology	33,870	4,034	37,904
Pathology (Stool)	17,427	1,877	19,304
Clinical Biochemistry	22,262	1,262	23,524
Pathology (Urine)	8,633	1,376	10,009
Haematology (Blood)	14,249	2,844	17,093
Serology	6,022	223	6,245
Miscellaneous	1,401	59	1,460
Media Preparation	3,400	x	3,400
TOTAL	107,264	11,675	118,939

activities and research support to the scientists and researchers for different ongoing protocols. To ensure better management and quick service, a database has been developed for the specimen reception area: to register and deliver reports for the outside paying cases; for day-to-day financial recovery reports; and for daily performance reports (number of tests, costs, etc.). A database for specimens stored in the cold room has been developed for easy retrieval.

The unit performed data analyses for different scientists and researchers for different ongoing protocols; supervised the cold chain activities of the division and also for PHSD's birth cohort study being conducted in Mirzapur; provided technical and software support for the division and produced 52 weekly surveillance reports for the Government of Bangladesh.

Animal Resources Branch

Head: K.A. Al-Mahmud

During 1996 the branch provided direct support to the scientists of the Centre in performing animal experiments of 8 approved research protocols, 6 approved inter-divisional research activities and a few exploratory experiments. It produced research animals of different species and extended its veterinary services through the Small Animal Clinic.

The branch maintained inter-institutional collaboration with the Institute of Public Health, Government of Bangladesh; IPGMR, BIRDEM, the Livestock Research Institute, Dhaka University, Bangladesh Agricultural University (Mymensingh), American International School and with some leading national and multinational pharmaceutical companies in Bangladesh.

Branch activities were reviewed by an external review committee, which expressed satisfaction with the activities of the branch. The committee's recommendation for the construction of a modern animal house has been discussed by the LSD Coordination Committee, the Council of Division Directors and also by the Board of Trustees.

Research and Treatment Section

Head: A.S.M. Hamidur Rahman

During 1996 this section performed its routine health monitoring of the laboratory animals and also accomplished the following:

Production of hyper-immune sera against different antigens using 16 adult New Zealand White Rabbits.

Monoclonal antibody production: Studies were performed on 350 Balb/c mice for immunizing them with

specific antigens for monoclonal antibody production and also for obtaining ascites fluid.

Ileal loop assay: The ileal loop assay was performed with various enteric bacteria/toxins using 18 adult rabbits.

Reversible intestinal tie adult rabbit diarrhoea (RITARD) Model: Experiments were performed on 18 adult rabbits to observe the diarrhoeagenic properties of different enteric pathogens.

Live cholera vaccine study: To support this project 18 adult rabbits were orogastrically fed with inoculum and then RITARD tests were done.

Absorption promotion studies: The absorption of different components of ORS was observed in 13 rabbits.

Sereny test: Eleven guinea pigs were used to observe and confirm the entero-invasive property of some bacteria.

LD50 dose: To determine the LD50 dose of different bacteria, 576 infant mice were used.

ST Test: 34 samples were tested using 110 infant Swiss Albino mice.

Metabolic study on rats: An exploratory study was conducted using 24 Long Evans rats to assess the effect of trace elements (Zn, Cu) on body weight gain, food intake and reproductive performance.

Support to CSD's Physiology Laboratory: A total of 20 rabbits were supplied to the laboratory.

Small Animal Clinic

Head: Motaher Hossain

The Small Animal Clinic extended its veterinary services to clients from outside by treating about 250 cases of pets, mostly dogs. These include clinical and surgical cases, vaccination, etc. and earned a revenue of about US \$ 2,000.

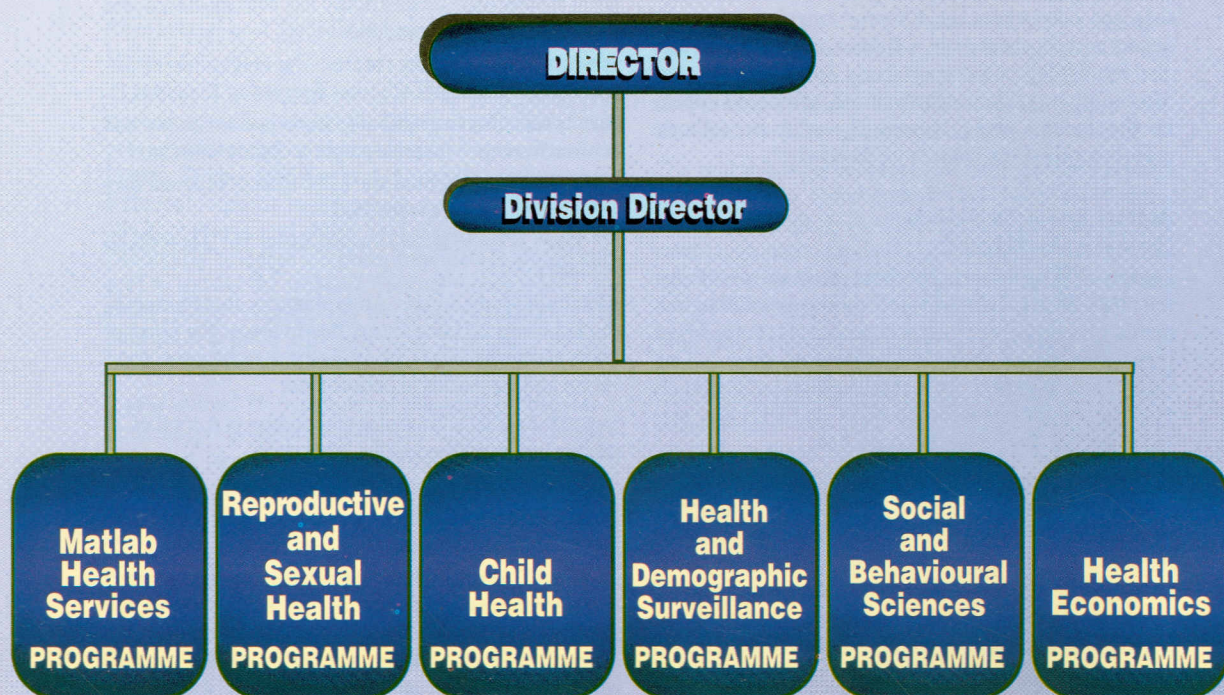
Production & Nutrition Section

Head: K.M. Nasirul Islam

The section has set up the facility for genetic monitoring of laboratory rodents, particularly the Balb/c inbred strain of mouse. A total of 782 Balb/c mice were produced during the year and 420 were issued. Other animals produced by this section during the year were 13, 941 Swiss albino mice, 1,142 rats, 920 rabbits and 576 guinea pigs.

The section earned around US \$3,000 through cash sales of surplus animals and 42,582 ml of blood from locally purchased sheep.

Public Health Sciences Division



PHSD

Public Health Sciences Division

Division Director
J. Patrick Vaughan

The recently renamed Public Health Sciences Division (PHSD)* focuses on public health intervention studies. The research projects are involved in reproductive health, sexual health, family planning, safe motherhood and child health at the community level. Research interests include epidemiologic patterns of ill health, transmission of infectious agents, (especially diarrhoeal, acute respiratory and nutrition-related illnesses), delivery of health care, prevention of illness through education, behaviour modification, and vaccines.

**Known previously as CHD (Community Health Division), the Division was renamed, effective December 1, 1996, as the Public Health Sciences Division (PHSD).*

Division Highlights

- ☐ The overall decline in maternal mortality in Matlab, following maternity care interventions, was found to be due to the combined efforts of community midwives and hospital referral services, including emergency obstetric care at the district hospital. (Funded by the Government of Japan and the Centre).
- ☐ Population surveys revealed that the prevalence of syphilis in pregnancy (1%) and ophthalmia neonatorum (1%) were a matter of public health importance. Syndromic clinical management charts for STDs were evaluated and modified for Bangladesh. Male STD clinics were opened at subcentres. (Conducted with LSHTM; funded by ODA, UK).
- ☐ Measles vaccine failures in children was not associated with concurrent vitamin A supplementation, suggesting that vitamin A can be given at the same time as this vaccine. (Funded by USAID).
- ☐ GIS spatial analysis showed the clustering of watery diarrhoea cases in children, with the incidence in some "baris" being 20 times higher (8.7/1000) than in some other "baris" (0.4/1000) in Matlab. (Funded by the Belgian Administration for Development Cooperation).
- ☐ In Matlab the Demographic Surveillance System (DSS) has been very active in bringing up to date all the annual data for the years 1993 to 1995 and in conducting a full socioeconomic census in late 1996. (Funded by ODA, UK).
- ☐ A controlled trial involving Matlab villagers showed that the intake of β -carotene-rich vegetable foods was increased considerably following household health education, even in poor families. (Funded by USAID).
- ☐ The Chakaria community health project successfully continued self-help in 60,000 people, with health education by volunteers of village-based organisations that focused on diarrhoea, water, sanitation and malaria. (Funded by the Swiss, German, and Dutch Red Cross societies).

PHSD The research and service activities take place in both rural (Matlab, Mirzapur and Chakaria) and urban (Dhaka city) areas, mostly among persons of low socioeconomic status. PHSD is the largest Division in the Centre, with a total of 537 employees and trainees in 1996. There were 12 international staff, 3 postgraduate students, 25 national-level scientists, 346 general services, short-term and contractual staff and 151 community health workers.

Three important reviews were conducted during 1996. These were, the **Social and Behavioural Sciences Programme** by Dr. Margaret E. Bentley of the Johns Hopkins University School of Hygiene and Public Health, and the **Health and Demographic Surveillance Programme** by Ms Sarah McFarlane from the Liverpool School of Tropical Medicine and of Matlab by Dr. David Ross of the London School of Hygiene and Tropical Medicine. All these reviews were favourable and positive.

The Matlab review by Dr. David Ross concluded that:

“The Matlab field research station has been one of the most productive field research centres which has ever been established in a developing country, especially within the field of large-scale trials of the efficacy of population-based health interventions. However, many of the systems currently in use at Matlab are now old. These urgently need to be modernized if Matlab is to remain a centre of excellence for population-based epidemiological and demographic studies over the next decade, let alone maintain the pre-eminent international status it has had in the past. Achieving this should be one of the top priorities of ICDDR,B over the next 3 years.”

Research activities are coordinated through 4 major scientific programmes, all of which interact in divisional activities of research, service, training, and administration. The four programmes are:

The Matlab Health and Research Centre,

The Matlab Maternal, Child Health and Family Planning Programme,

The Social and Behavioural Sciences Programme, and

The Health and Demographic Surveillance Programme.

Matlab Clinical Research Centre

Coordinator: Md. Yunus

The Matlab Clinical Research Centre includes scientists and physicians whose primary involvement is in the Matlab Diarrhoea Treatment Centre (DTC). The Matlab DTC and the 3 Community Operated Treatment Centres (COTCs) located at Nayergaon, Kalirbazar and Shataki provide clinical care for diarrhoeal patients from Matlab and its surrounding areas. The Matlab DTC conducts clinical research, provides training in the clinical management of diarrhoea and also supports numerous research projects.

Matlab Diarrhoea Treatment Centre

Head: Md. Yunus

Funded by: The Centre

During 1996, a total of 10,068 patients were treated at the Matlab DTC. Of these, 24% came from within the Demographic Surveillance System (DSS) area and 76% from outside. The case fatality rate was 0.91%.

Another 2,921 patients with diarrhoea were treated at the 3 COTCs. Five patients died in these centres, a case fatality rate of 0.17%.

Stool specimens from 2,387 patients from the DSS area were cultured and yielded two main pathogens: *Vibrio cholerae* O1 (9%) and *Shigella* spp. (9%). *V. cholerae* O139 was isolated from only 2.5% cases. Fig.1 (overleaf) presents the isolation rate of these organisms for the last 8 years.

Aetiological agents identified in patients from Matlab DSS area*
Matlab Diarrhoea Treatment Centre, 1996

MONTH	No. of patients	DSS area	<i>V. cholerae</i> O1	<i>V. cholerae</i> O139	<i>Shigella</i>	<i>Salmonella</i>
JAN	720	154	3(2)	3(2)	25(16)	1(1)
FEB	505	128	5(4)	0	6(5)	1(1)
MAR	633	196	9(5)	3(2)	12(6)	0
APR	1,231	286	33(12)	2(1)	22(8)	1(<1)
MAY	1,138	245	28(11)	3(1)	14(6)	0
JUN	848	207	23(11)	2(1)	24(12)	0
JUL	735	239	22(9)	0	14(6)	2(1)
AUG	640	188	19(10)	0	12(6)	4(2)
SEP	798	209	30(14)	1(<1)	19(9)	6(3)
OCT	811	188	24(13)	10(5)	14(7)	4(2)
NOV	1,040	181	16(9)	30(17)	27(15)	3(2)
DEC	969	166	9(5)	6(4)	18(11)	0
	10,068	2,387	221(9.3)	60(2.5)	207(8.7)	22(0.9)

*Figures in parentheses are percentages of DSS area patients

PHSD Priorities for 1997

✱

Develop proposals for Vaccine Trials

- Maternal and infant
pneumococcal immunisation trials
- Rotavirus vaccine trial

✱

Develop new research activities in Reproductive Health in

- Adolescent health
- Safe motherhood
- Control of STDs in urban populations

✱

Prepare proposals to strengthen the Health and Demographic Surveillance Programme

- Implement new computing equipment
and software
- Prepare a proposal for modernisation of DSS
- Integrate the health information systems of
RKS and GIS with DSS

✱

Develop plans for the future Matlab Integrate the management of all Matlab health services

- Prepare a proposal on
essential reproductive health for funding
- Establish linkages with GOB's District and
Thana health services for patient referrals

✱

Implement plans for the reorganisation of the new Public Health Sciences Division

- Prepare programme work plans for 1997
- Establish a new Health Economics Programme
- Recruit two new international staff in
social sciences and epidemiology

The isolation of *V. cholerae* O1 and *Shigella* spp. declined from that of last year but the isolation of *V. cholerae* O139 rose slightly during the year.

The most common species of *Shigella* isolated during 1996 was *S. flexneri* (63%) followed by *S. dysenteriae* type 1 (28%).

Figure 2 (overleaf) depicts the resistance pattern of *Shigella* isolates to common antibiotics over the last 6 years. There was an increase in the resistance to *Shigella dysenteriae* type 1 to mecillinam over the last year. *S. flexneri* and other species of *Shigella* were still sensitive to nalidixic acid.

Microscopic examination of 1,751 stool samples was performed and the main ova and parasites detected were: *Ascaris lumbricoides* (25%), *Trichuris trichura* (13%), *Giardia lamblia* (3%), hookworm (2%), and *Entamoeba histolytica* (2%).

The Matlab Centre hosted 183 visitors during 1996 including representatives of donor agencies, visiting scientists and foreign diplomats.

Matlab Staff Clinic

Head: Md. Yunus

Funded by: The Centre

The Matlab Staff Clinic provides health care to staff and their dependents. During the year 4,021 patients were treated as outpatients and 79 were hospitalised.

Does disease due to *V. cholerae* O1 confer protection against subsequent diarrhoea due to *V. cholerae* O139?

PIs: M.Yunus, John Clemens and K. Zaman

Funded by: NIH (National Institutes of Health), USA.

The new strain of cholera designated as *V. cholerae* O139 has emerged as a cause of epidemics of cholera-like diarrhoeal illness in India and Bangladesh, and has spread to several neighbouring countries with potential for a pandemic. The disease primarily affects adults, which suggests that the population lacked natural immunity to this organism.

A case-control study is being carried out to assess whether an initial treated episode of diarrhoea due to *V. cholerae* O1 was associated with a reduced risk of a subsequent episode of diarrhoea due to *V. cholerae* O139, during a period of up to 10 years following the initial episodes.

Cases are Matlab residents with diarrhoea associated with *V. cholerae* O139 detected at the Matlab DTC during 1993-1995. Controls are subjects who did not

ISOLATION

%

25

FIG. 1 – Isolation rate of vibrios and *Shigella* species
Matlab Diarrhoea Treatment Centre 1989 – 1996

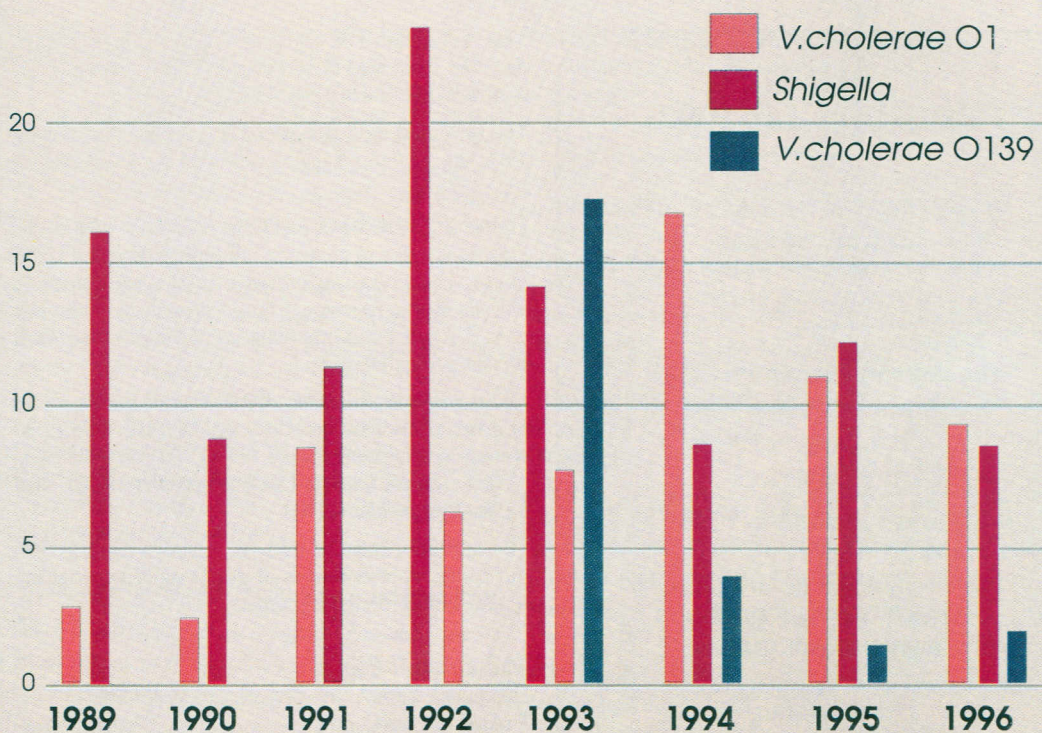
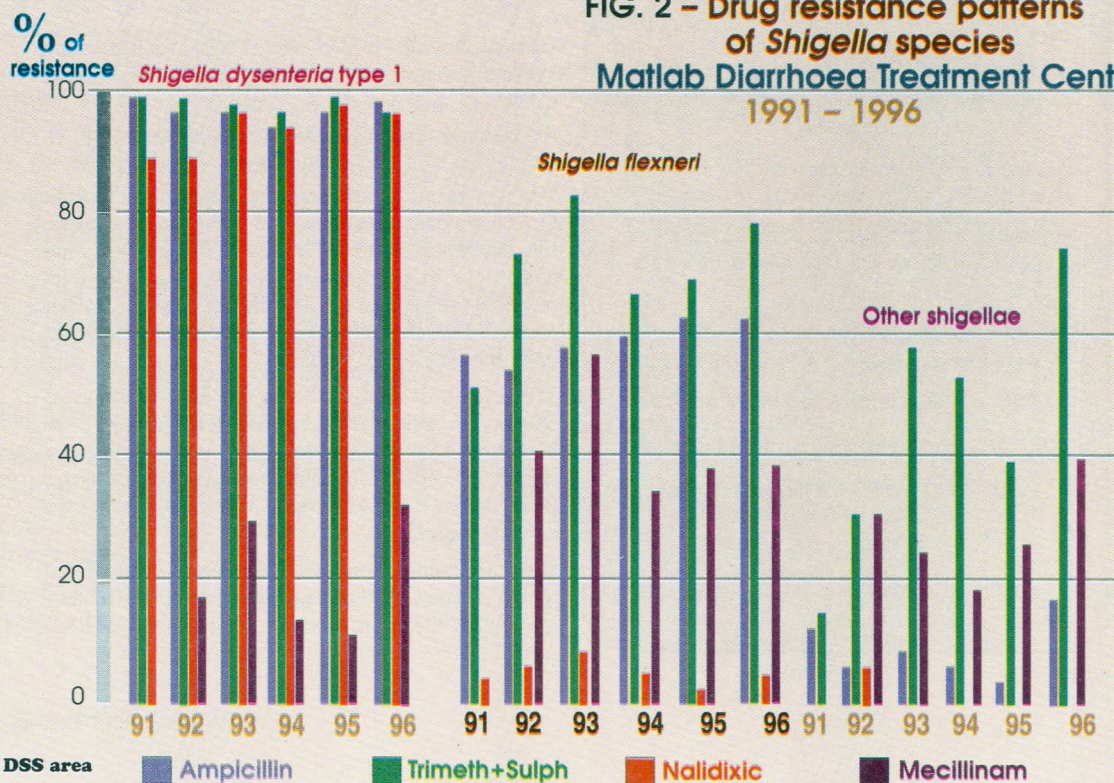


FIG. 2 – Drug resistance patterns of *Shigella* species
Matlab Diarrhoea Treatment Centre
1991 – 1996



develop this outcome during 1993–1995, and will be matched to the cases by age, sex, neighbourhood ("bari") of residence at the time they became ill, and duration of residence in the Matlab DSS area.

Cases and controls will be contrasted for the comparative occurrence of an earlier episode of treated *V. cholerae* O1 diarrhoea during the period 1983–1992, using odds ratio appropriate for matched data. Estimates will be made of 95% confidence intervals for these odds ratios using test-based methods, or exact techniques when mandated by sparse data. Data for this study are being collected from existing hospital information on cholera patients at the Matlab DTC, and socio-demographic information from the DSS records. The results of this study could have important implications for future cholera vaccine development and cholera control.

Children's fluid intake during diarrhoea: a comparison of questionnaire responses with data from observations

PIs: K. Zaman, J. Chakraborty, Md. Yunus,

A. de Francisco, D.S. Alam and K.M.A. Aziz

Funded by: WHO

This study will assess the use of simple questions put to child caretakers to estimate the proportion of young children being offered or receiving increased quantities of fluids during diarrhoeal episodes, by comparing caretaker responses with data obtained by direct observation. Two groups of children/caretakers will be recruited by active diarrhoea surveillance.

Children aged 4 to 35 months and having diarrhoea at the time of surveillance will be observed next day for fluid intake at home for 12 hours during diarrhoea and two weeks after, when cured (Group A). The next day the caretakers of these children will be interviewed, using a standard questionnaire. Children with diarrhoea in the past two weeks on the day of surveillance will be in Group B. The same questionnaire will be administered to the caretakers on the day of surveillance.

A total of 195 children will be recruited into Group A and 390 into Group B. Agreement at the individual and population level will be assessed by comparing the observational data with the questionnaire data.

The pilot phase of the study, including standardisation of the field workers, developing the instruments, pre-testing of the questionnaire and observational procedure has been completed. So far 67 children in Group A and 160 in Group B have been recruited. The study will contribute to the development of guidelines for conducting future surveys on home management of diarrhoea.

Evaluation of a packaged rice-ORS in cholera and cholera-like illness in children

PIs: K. Zaman and Md. Yunus

Funded by: Thrasher Research Fund

The objective of the study is to evaluate the pre-cooked packaged rice-ORS as a treatment for rehydration and maintenance hydration in patients aged 5–15 years with cholera and cholera like-illnesses. This is a randomised, controlled clinical trial of a new pre-cooked packaged rice-ORS and its efficacy will be compared with the standard glucose-ORS.

Patients aged 5–15 years admitted at the Matlab DTC with severe dehydration will be randomised to either packaged rice-ORS or packaged glucose-ORS. A total of 78 patients will be recruited in each group. Diet and antibiotic treatment will be given according to standard procedure. During their stay in the hospital intake and output measurements will be done every 8 hourly. Stool output, vomitus, urine output, intake of ORS, serum electrolytes level will be compared between the two groups. The study has so far enrolled 100 patients. The results of the study will contribute to the advances in the development of appropriate formulation of rice-ORS suitable for treatment of cholera and cholera-like diarrhoeas.

Efficacy of Bismuth-subsalicylate in preventing acute diarrhoeal episodes from becoming persistent in rural Bangladeshi children

PIs: Hafizur R. Chowdhury, Md. Yunus, K. Zaman and A. Rahman

Funded by: Procter & Gamble

The objective of the study is to evaluate the role of Bismuth-subsalicylate (BSS) in a dose of 100 mg/kg/day administered in 4 divided doses for 5 days in preventing acute diarrhoeal episodes from becoming persistent. This is a randomised clinical trial in 1,240 rural Bangladeshi children aged 4–36 months admitted to the Matlab Diarrhoea Treatment Centre with acute watery diarrhoea of less than 72 hours' duration. The study children are randomly assigned to receive either BSS or placebo along with standard case management.

All children are required to stay in the hospital for 5 days in order to ensure therapy. The study patients who leave the hospital before cessation of diarrhoea are followed up at home on alternate days up to 14 days from the onset of diarrhoea to determine whether the current episode has resolved or become persistent i.e. continued for 14 days or longer.

The study started in February 1996 and, so far, 346 children have been enrolled. Of them, 186 (54%)

required field follow-up. Of 326 cases with complete clinical information, including field follow-up, 29(8.9%) cases became persistent. No adverse drug reactions were observed so far. If Bismuth-subsalicylate is found to be effective, it could be an useful therapeutic addition in prevention of persistent diarrhoea.

Matlab Maternal and Child Health and Family Planning (MCH-FP) Programme and Record Keeping System

Head: A. de Francisco

Funded by : The Government of Japan and the Centre

A variety of activities took place during 1996 under the umbrella of the MCH-FP Programme. One international workshop on improving effectiveness and quality of care in MCH-FP Programmes through Operations Research, funded through a Government of Japan grant to the Matlab Programme, was conducted at the Centre (see training section).

Field work for an extensive study on Reproductive Tract Infections throughout the Matlab intervention area established the prevalence of RTIs and STDs in symptomatic and asymptomatic segments of the population. Steps are under way to integrate their management within the PHC structure. The analysis of interactions between measles vaccination and vitamin A supplementation was done and published.

A thorough analysis on the safe motherhood intervention in the Matlab treatment area was completed and showed the importance of the referral system in maternal mortality ratio reductions. Further analysis on the predictive value of antenatal screening and on the referral pattern of complicated pregnancies is planned for the first few months of 1997. The analysis of the wheezing-associated respiratory distress protocol was completed, indicating the importance of wheezing and RSV in ALRI control programmes.

Family Planning

PIs: A. de Francisco & J. Chakraborty

Funded by: The Government of Japan

The Programme achieved a contraceptive users prevalence (CUP) rate of 70 percent, the highest ever reported in Matlab and approximately one-half higher than the national average. The CUP rose steadily over the year. The total fertility rate has been reported by the Demographic Surveillance System to be below 3.0 in the area. The programme is geared toward improving

the quality of care of services provided at the sub-centres and at the hospital.

Activities were initiated with Programme staff to involve men in family planning activities. Contacts with men regarding their reproductive intentions and desired family size were initiated in an attempt to find out male perceptions towards reproductive health.

A comprehensive programme for male involvement is being planned and will be implemented during 1997. Further, the degree of communication between the couples will be looked into, in order to improve and optimise the activities carried out by the Programme.

Similarly, in order to improve quality of care provided by the Programme, the reproductive intentions of the couple were matched with the family planning method used. It became apparent that, to a large extent, couples who have mothers over 35 years of age and have at least two children – with no intention of having any more – are still using temporary methods.

The Programme will explore ways to stimulate further couples in that situation to opt for clinical methods of contraception. This will be part of the reproductive health programme activities during 1997.

By the end of 1996, a total of 12,880 women were contraceptive users, of whom 52% were using injectable contraceptives (DMPA) and 27% oral contraceptives, a proportion similar to last year's.

Current service-oriented research activities include the screening and treatment of women with side-effects from contraceptive use. Initial management of side-effects is carried out at the home level by Community Health Workers (CHWs). However, the women are referred to programme paramedics posted at the sub-centre if this initial treatment is not sufficient.

During the year, a total of 5,634 women using DMPA, 1,928 women using the pill, and 378 women using an IUD were seen at the out-patient departments of the four sub-centres and at the Matlab hospital. These consultations included both reassurance on the method use, counseling, management of side-effects or controls.

Programme physicians performed 49 tubectomies during the year. There were no reported complications and patients were released after only two days at the hospital. Long-term observation for possible complications through household visits is being carried out by the Programme. No vasectomies were performed during this period.

Reproductive Tract Infections in Matlab

PIs: Sarah Hawkes, A de Francisco, J. Chakraborty,
Kaniz Gausia and Nazmul Alam

Funded by: ODA (UK)

Data collection for this study on the prevalence of reproductive tract infections (RTIs) and sexually transmitted diseases (STIs) ended in Matlab. An impressive array of activities – carried out both in the community and at the health centres and hospital – ensured the success of the study. Male sexual health clinics continue to attract men with STIs or psychosexual health problems.

The study is looking at 4 main areas in which it plans:

- to investigate the prevalence, aetiology and risk factors of RTIs (including STIs) in population-based samples of men and women;
- to determine the prevalence of morbidity and perceived ill-health related to RTIs, and to further understand health-care seeking behaviour in relation to RTIs;
- to ascertain the antimicrobial resistance patterns of the most common infections; and
- to work toward the development of a replicable and sustainable programme of training health care workers in the recognition, management and prevention of reproductive tract infections.

During the period of this report, the aetiologically based prevalence surveys of RTIs/STIs in population-based samples were completed to study the:

- * prevalence of syphilis in pregnant women (n=1,000);
- * incidence of ophthalmia neonatorum in neonates (n=1,000); and the
- * prevalence of selected RTIs/STIs in population-based samples of men and women of reproductive age (n=1,600).

The assessment of syndromic management flow charts for RTI/STI case management at the PHC level in rural Bangladesh is (n=500). Laboratory diagnosis and analysis of the data collected is under way and will be completed during 1997. Results so far indicate a moderate level of RTIs, which cause symptoms that can be difficult to distinguish from STI symptoms; a low/moderate level of most bacterial, viral and protozoal STIs in the population-based samples; a moderate (but not insignificant) level of syphilis in all population groups, most importantly in pregnant women; and a moderate incidence of ophthalmia neonatorum.

Initial assessment of the validity of syndromic management flow charts suggests that the flow charts are

sensitive and specific for the management of certain syndromes, namely genital ulcer, inguinal buboes and urethral discharge in men. The most common syndrome, vaginal discharge, has the flow chart with the lowest predictive value, even when used with risk-screening questions; the usefulness of flow charts will increase if staff are trained in clinical skills along with their theoretical training.

In response to a perceived and unmet need in STD services, and working within the paradigm for action enunciated at the Cairo International Conference on Population and Development (ICPD), STD clinics for men in the 4 Matlab primary health care centres have been established. Staff involved in day-to-day clinical management attended a 1-week course on syndromic management. All 80 CHWs (community health workers) attended a 1-day training session on STDs and HIV/AIDS.

Community-based control of Acute Lower Respiratory Infections (ALRI) through case finding, management and referral

PIs: A. de Francisco & J. Chakraborty.

Funded by: The Centre

ALRI is a major cause of death in under-5 children in Matlab. The case management strategy promoted by WHO for the control of ALRI relies on the recognition of cases by caretakers of sick children and subsequent contact and management by the health services. The ALRI intervention in Matlab was initiated in 1988 with the goal of decreasing morbidity and mortality of children suffering from pneumonia.

This pioneering programme has been instrumental in providing information to the National ALRI Control Programme on the application of such an intervention in rural Bangladesh. Present activities are focused on the isolation of aetiological agents causing ALRI.

The Programme has reported an annual incidence of 36% for infants and 14% for children aged 1-4 years. In total, 78% of cases are moderate and 22% severe; most cases (86%) are detected passively at home by CHWs.

The Programme has also shown potential for reducing mortality by 32% with training of health workers on the detection of patients with fast breathing and their management with oral Co-trimoxazole or, alternatively, referral to the health centre or hospital.

A close relation between malnutrition and severity of the ALRI episode, as well as high morbidity and mortality in young infants, has been found. Data produced by the Programme indicate the significance of repeat episodes – with 35% of episodes being repeated. It is

PHSD estimated that a large proportion (80%) of families do use oral Co-trimoxazole as prescribed.

Wheezing-associated respiratory disorders (WARD) and hypoxemia in hospitalised children under five years of age

PIs: Samuel Erny, A. de Francisco, Md Yunus, J. Chakraborty, R. Shaheen, L. Unicomb, G. Podder, K. Gyr and R.B. Sack.

Funded by: SDC

Analysis of this prospective study is progressing. In this hospital-based study, clinical data was collected over a period of 22 months on more than 600 illness episodes in under-5 children. Most cases had been detected at home by CHWs and referred with a diagnosis of severe ALRI. The purpose of this study was to evaluate wheezing-associated disorders diagnosed as severe ALRI through WHO algorithms.

The study indicated that half of the children referred and admitted to the ALRI hospital with a diagnosis of severe ALRI had any degree of wheezing. This proportion was higher for those with recurrent chest problems. Aetiological analysis continues but it was evident that more than half of the detected viruses were RSV.

Safe motherhood in Matlab

PIs: A. de Francisco, J. Chakraborty, A.M. Vanneste, and D. Maine

Funded by: The Centre

During 1996 a series of reviews of the safe motherhood programme were carried out, along with modifications of the ongoing programme. A paper (*Why did maternal mortality decline in Matlab?*) was published by Studies in Family Planning. The study reviews comprehensively the possible reasons for the maternal mortality decline reported in Matlab by Fauveau during 1987-89. The study included new data collection and computerisation of process indicators.

The study focused on the management of complications at all levels and examined hospital records available from the Chandpur Hospital (referral point), as well as computerisation of services provided by midwives. The paper argues that, although the reductions in obstetric mortality reported earlier are real, these may have been due to quality services provided by a combination of community midwives and Matlab hospital staff (including female physicians) – integrated through an efficient, round-the-clock referral system.

The data further indicate that the decline in deaths also depended upon the functioning of higher levels of the health system, specifically the hospital in

Chandpur, where comprehensive EOC was available. A maternal death audit and a reclassification of maternal deaths according to specific guidelines is being analysed at present. A series of interviews have been conducted with women who either accepted or refused referral to a higher level of care. Further, meetings are being conducted with relatives of women who have signs suggestive of potential complications. Reports on these activities are expected in 1997.

These findings have implications for the future of the safe motherhood component of Matlab's MCH-FP Programme. Although provision of a functioning end referral point is of paramount importance, so is the understanding of barriers and methods of referral and management of complications at all levels of health.

Nutrition surveillance system and rehabilitation unit

PIs: A. de Francisco & J. Chakraborty

Funded by: Helen Keller International (HKI) and the Centre

The Project is currently collaborating with Hellen Keller International in a countrywide nutrition surveillance system in disaster-prone areas. Reports on anthropometric measurements (weight, height and Mid-Upper Arm Circumference (MUAC)) in groups of 500 infants both in the treatment and comparison areas are produced every three months by HKI.

Measurement of MUAC is performed every three months for all under-5 children in the Matlab MCH-FP intervention area. If the MUAC is between 120 and 110 mm, the child is closely monitored. However, if it is below 110mm, the child is referred to the Nutrition Rehabilitation Unit (NRU) of the MCH-FP Programme. There, management of sick children is ensured by prompt treatment of complications. Mothers are involved in the preparation of simple, inexpensive food which, given with regular frequency under supervision, improves the nutritional status of their children in most cases.

Health services: mother and child

PIs: A. de Francisco, J. Chakraborty and S.A. Khan

Funded by: The Centre

This component of the Programme includes interventions directed towards the reduction of mortality and morbidity, and the management of morbidity of women of reproductive age and their under-5 children through the primary health care structure. Activities have been included over the years in order to target specific conditions that contribute to disease burden.

The strategy is to introduce health services in geographically separate areas in order to evaluate their impact through the Record Keeping System (RKS) and to provide an infrastructure for related research.

Service statistics for 1996 indicate that 1,986 deliveries were recorded. In 325 (16%) cases, Programme nurse-midwives were called to the delivery and were present, but only in 193 (10%) of the cases did they actually perform the delivery. A total of 77 (4%) complicated deliveries were referred to the Matlab MCH-FP Maternity Care Ward to be attended by Programme physicians, and another 47 (2.5%) were referred to the Chandpur regional hospital.

Antenatal care was provided by CHWs in 6,076 cases, and by nurse-midwives in 1,792 cases. Thus, every pregnancy recorded had about 3 antenatal contacts with CHWs. Postnatal care was provided on 251 occasions by nurse-midwives. The relation between risk detection by nurses and by CHWs is being examined and predictive values of risk detection are being calculated on a variety of outcomes.

Admissions to the Matlab Hospital were recorded in 217 cases, of which 69% were related to maternity and the rest to specific pathology. The outpatient department saw 15,521 women of reproductive age during the year, of whom 57% were there for follow-ups of contraceptive methods – the largest group being women using injectable contraceptives.

A total of 712 under-5 children were admitted to the hospital during 1996, of whom 60% were suffering from severe Acute Lower Respiratory Infections (ALRI), and 5% from severe malnutrition. The outpatient department of the Hospital and the four sub-centres attended 4,695 infants and 8,662 children aged 1 to 4 years of age. A total of 184 children were diagnosed and treated for dysentery in 1996.

Immunisation data for the year show that 95% of infants were immunised with BCG, 83% with DPT III, 95% of children 9 to 23 months of age against measles and 97% of women of reproductive age with two doses of tetanus toxoid. In total, 14,040 children over six months of age were given vitamin A capsules, reaching a coverage of 98%.

There were 983 reported ALRI cases during the year, of which 75% were treated at home by CHWs, and 25% were referred to the ALRI Unit at the Matlab Hospital. During the year 152,577 locally made ORS packets were distributed and 2,486 safe delivery kits were produced and distributed to pregnant women in the intervention area.

Record Keeping System (RKS)

Head: A. de Francisco

Funded by: The Centre

Since 1990 the Project has used a computerised record keeping system that provides feedback to field workers within one month of data collection for better service delivery and supervision. Mothers and children at risk are thus targeted far more efficiently by the CHWs.

This translates into a better organisation of CHWs' activities by targeting their household visits and improving the quality of care through increased time contact between care-providers and recipients. Data on health system delivery are available from computerised files for analysis and monitoring of the Programme.

The Government of Bangladesh has now introduced a similar system to monitor the performance of its MCH-FP programmes throughout the country.

During the period of this report, the RKS initiated a programme to clean, edit and prepare data files for subsequent analysis. In brief, all reproductive health indicators since 1977, and all child health services provided since 1986, will be computerised and brought up-to-date.

As a result, analysis from specific sectors of the Matlab MCH-FP Programme can now be carried out comprehensively by collaborative arrangements with universities in Bangladesh and abroad.



Matlab's CHWs, usually referred to by the rural population as "daktarnis," play the role of health counsellors and friends in need.

PHSD Routine RKS information includes these variables:

For the family:

Religion, household area and type, number of living children, desire expressed for additional children and the dates of these household visits.

For the mother:

Age, education, and gravidity; TT vaccination dates and family planning history, reproductive and lactation status, morbidity and referrals.

For each under-5 child:

Age and sex, vaccination supplementation status with dates. For pneumonia: date of onset, mode of detection, respiratory rate, severity, management, follow-up and outcome; maternal recall for pneumonia (4 weeks) and diarrhoea (2 weeks), feeding practices, referrals and other morbidity.

Geographic Information System (GIS Lab)

PIs: J. Myaux & M. Ali

Funded by: BADC (Belgian Administration for Development Cooperation)

The GIS unit has updated and created geo-referenced data files both for the Matlab study area and for Dhaka. A study on the location of the residence of patients who attended the diarrhoeal hospital in Dhaka in 1995-96 was initiated with the aim of looking at the spatial dynamics of attendance over time.

Geographic distribution of STDs and RTDs in the Matlab community is being explored to correlate the diseases with environmental factors in the area. GIS is now using additional software for surface analysis (SURFER) and image technology (IDRISI). The use of Internet resources now allows communication with other institutions and data transfer for collaborative activities.

Social effects and changes in reproductive behaviour

PIs: K. Munshi & J. Myaux

Funded by: Belgian Administration for Development Cooperation (BADC).

This study on neighbourhood or social influences on contraceptive use and sexual behaviour was initiated by Boston University in collaboration with the Center. The Matlab dataset, with injectable contraceptive use as an indicator for the introduction of a new technology, is being reviewed over a 10-year period. By examining spatial variation across the villages, the authors aim at exploring the differential effect of peer influence and social learning on motivational changes in reproductive behaviour. The results of the study may contribute to the optimal design of information pro-

grams aimed at changing sexual behaviour and practices in developing countries.

Environmental and spatial components related to sexually transmitted diseases (STDs) and reproductive tract diseases (RTDs) in Matlab

PIs: J. Myaux, M. Ali and S. Hawkes

Funded by: Belgian Administration for Development Cooperation (BADC).

To what extent is the rate of frequent sexual partner change, a known determinant in the spread of sexually transmitted diseases (STDs), encouraged by certain demographic factors? This proposal examines the spatial distribution and dynamics of STD cases and possible environmental risk factors in the Matlab treatment area. The study focuses on the mobility of the people (history of migration, easy access to a communication network) and easier interaction in the community (proximity to bazaars, density of population).

The role of health workers' catchment areas as a determinant of contraception coverage rates in rural Bangladesh

PIs: M. Ali, A. de Francisco, M. Emch, J. Chakraborty and J. Myaux

Funded by: Belgian Administration for Development Cooperation (BADC).

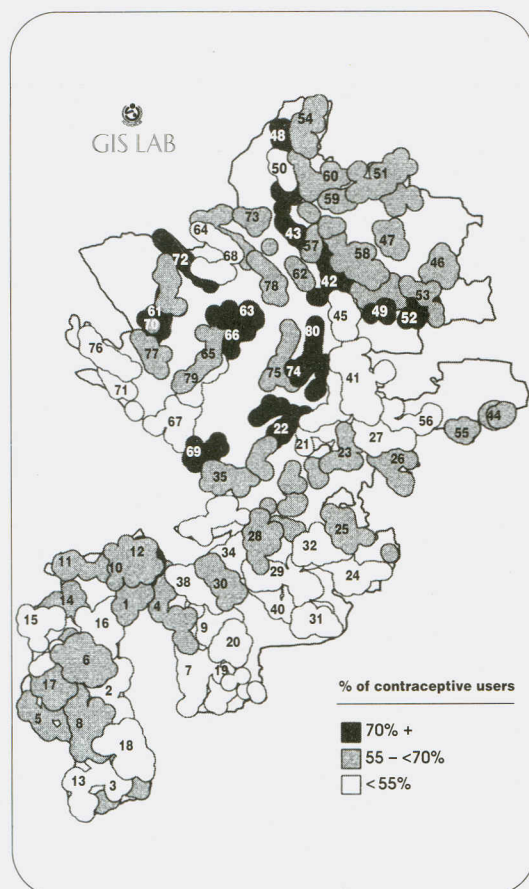
This study reviewed contraceptive coverage in Matlab across the CHWs' catchment areas. In 1993, the average contraceptive coverage by CHWs was 63% of eligible couples with a range of 45% to 78% among the workers. This study analyses the variation among the CHWs' levels of success according to the geographical characteristics in their intervention area. These included density of population, the presence of rivers as a barrier for the service provider, the presence of primary schools, bazaars and mosques as indicators for communication within the community. Successive multiple regression models controlled for socioeconomic and personal profiles of women of reproductive age. The study reveals that the size of the catchment area does affect the CHWs' performance.

Anaemia during pregnancy in an urban community of Bangladesh: a study of prevalence, validation of simple methods and impact of iron Folic Acid supplementation

PIs: T. Juncker and A.M. Vanneste.

Funded by: Belgian Administration for Development Cooperation (BADC).

The aim of the study is to contribute to the formulation of a more effective health policy and its imple-



mentation in anemia control. It has been found that 51% of pregnant women are anaemic but only 2% have severe anaemia (HB below 8gr/dl).

The sensitivity and specificity of the clinical test and of a haemoglobinometer test for detecting anaemia have been studied and the cost-effectiveness of various strategies for iron supplementation has been examined (paper submitted for publication).

Recent retrospective studies have indicated adverse effects of iron supplementation in non- or moderately anaemic pregnant women. The negative effects of iron supplementation are measured through a randomised double-blind community-based trial in a slum area of Dhaka. Pregnant women with a Hb level ≥ 9 gr/dl are eligible to enter the trial. The outcome variables are intrauterine death, low birth weight, eclampsia, pre-eclampsia and maternal infection.

Emergency Obstetric Care (EOC) at the Union level

PI: T. Juncker

Funded by: BADC

The Safe Motherhood program in Matlab is moving in a new direction, with community awareness and participation being given high priority. The aim is to bring basic EOC closer to the community to strengthen the first link of the referral chain. At the same time, quality of care is being improved. A delivery unit has been set up at the sub-center clinic in Block C. The pregnant women's decision makers are encouraged to bring relatives to the clinic for delivery and trained TBAs have been motivated to accompany clients to the clinic.

Since its opening in August 1996, this sub-center clinic has performed 15-20 deliveries each month. From December 1996, the CHWs started to play a new role in antenatal care. With the support of a pictorial card, the CHWs are educating families about the signs of obstetric emergencies and the need to go to the clinic immediately.

The data collection system is being redesigned to make it more suitable for providers and researchers. A newly designed card for follow-up of pregnant women throughout the antenatal, delivery and the post-partum periods is being field tested. Refresher training on the management of obstetric complications was provided to all midwives and LFPVs. A training workshop on infection prevention was held and disinfection of instruments – immediately after use – was introduced in all the clinics.

Social and Behavioral Sciences Programme

Acting Head: J. Patrick Vaughan

Funded by: The Ford Foundation

Since the establishment of the Social and Behavioural Sciences (SBS) Programme at the Centre, SBS has been working under the assumption that there is significant need for utilizing qualitative and quantitative research tools in its biomedical and demographic research.

Over the past two years the SBS research team has received training in state-of-the-art skills in qualitative research, including computer use for data processing and analysis. Training in computer utilisation is considered a vital part of up-to-date qualitative research methods, and the SBS team is playing a leading role in disseminating these skills to other units within ICDDR,B as well as to other research organisations.

The main computer software programs for qualitative data analysis taught by our SBS team are ANTHROPAC (for management and analysis of free listing, pilesorts, ranking/rating, etc.) and dtSEARCH (for sifting through extensive text data). SBS

researchers are still in the learning process through training and by conducting in-depth interviews with key informants, focus groups or participatory exercises, and undertaking freelist and pilesort exercises. These exercises will be integral to the existing protocols, e.g. BRAC/Matlab, MCH-FP and other similar projects.

It is expected that, in future, SBS researchers will not only be able to independently write protocols and conduct research but will also be able to provide professional support to other research activities where social science input is needed.

Explanatory models of reproductive tract infections and "sexual disease" in the culture of rural Bangladesh

PI: J.L. Ross

Funded by: The Ford Foundation

This research has been designed mainly to understand the various complex explanatory models used by men and women in rural Bangladesh regarding sexually transmitted diseases (STDs) and reproductive tract infections (RTIs).

Other objectives include understanding treatment-seeking behaviour, attitude and people's perceptions

about condom use and also to help to develop guidelines for the design of intervention programs.

The research is being carried out in conjunction with RTI/STD clinical investigations currently being carried out by Dr. Sarah Hawkes and colleagues. Sixty male STD cases and a similar number of non-cases, 60 female RTI cases and a similar number of non-cases will be selected for in-depth interviews. This is an ongoing research project and almost half of the field-work is completed. One female and 2 male SBS researchers are presently involved in the study.

Hear them speak: women's perspectives on the cause, consequence and management of contraceptive side-effects

PIs: J.L. Ross, P. Pelto and S. Laston.

Funded by: The Ford Foundation

This research has been designed to describe and analyze women's perceptions of the causes, consequence and management of contraceptive side-effects. Three SBS researchers have collected preliminary information through unstructured interviews and content analysis of key informant interviews and group discussion. Further data collection will continue.



A health worker involved in IEC activities speaks to a group of women from Matlab's rural neighbourhoods or "baris."

Women's network analysis

PIs: J. L. Ross & S. Laston

Funded by: The Ford Foundation

During the year SBS researchers were involved in the collection of a large amount of information on existing women's networks from three Matlab villages. The villages are: BV1 Taltali, V98 Santoshpur and V99 Baluakandi. These villages are likely to be brought under BRAC's programme soon. The information collected will provide baseline information to find out how the women's network changes as a result of BRAC intervention. The data have been already entered and will be analyzed soon.

Perception of sex and sexual behaviour in relation to STDs and HIV/AIDS: An in-depth look at the Tanbazar brothel of Narayanganj

PI: Habibur Rahman

Funded by: The Ford Foundation

This study has been designed to provide a better understanding of sexual and health care-seeking behaviour, condom use, and knowledge about STDs among the clients of "commercial sex workers" (CSWs).

The study is being conducted in the Tanbazar brothel, Narayanganj, one of the largest in Bangladesh. A total of 100 clients – permanent, frequent and infrequent – will be studied through a mix of qualitative and quantitative tools, with emphasis on unstructured interviews. The SBS researchers involved will collaborate with the Bangladesh Women's Health Coalition (BWHC), who will help recruit clients willing to be interviewed.

Implementation of nutrition education strategy for promotion of β -carotene-rich foods as a source of vitamin A in children

PI: K.M.A. Aziz

Funded by: SDC (Swiss Development Cooperation)

Preliminary data analysis on consumption and preparation of green leafy vegetables by the target children and their mothers – and dissemination of results – was completed in 1996. Based on the preliminary analysis, two papers were presented at ICDDR,B's Fifth Annual Scientific Conference held in Dhaka in January 1996.*

The results showed that changes in the feeding practices of young children were feasible through education and motivation, which can develop confidence

among caregivers regarding the nutritional benefits of the recommended foods. The results also showed that there was a corresponding change in the food consumed by mothers of the study children.

This intervention study shows that food resources have a manifold significance in cultural and socio-psychological as well as strictly nutritional terms and that focusing on mothers of young children helped the intervention achieve improved nutritional status in the target population. After being convinced themselves about the nutritional benefits of GLVs, the fact that these women were able to convince others in their lineage to increase Green Leafy Vegetable (GLV) intake was due to several factors.

First, GLV resources are readily available and well-to-do neighbours usually allow poorer neighbours to pick wild GLVs – which they do not consume themselves because of their status – from their fields. There is now a widespread belief in the study community, despite their previous tendency to eat only rice and salt meals, that one should not fill the stomach with rice alone. Second, these mothers living in lineage-based compounds form an important women's network and exchange knowledge on a daily basis. The significance of such informal knowledge-sharing networks is critical in designing interventions for illiterate populations.

The impact of social and economic development programmes on human health and well-being: A BRAC-ICDDR,B collaborative project in Matlab

Project Directors: A. Bhuiya & M. Chowdhury

Funded by: The Aga Khan Foundation, The Ford Foundation and The International Center for Research on Women

During the first half of 1996 this project completed its quarterly quantitative surveys, started earlier in 1995, on income, expenditure, illness and illness behaviour, nutrition and feeding practices among a sample of BRAC-member and non-member households.

Preliminary analysis of data shows that the impact of BRAC membership on these factors is not strongly visible as yet. However, in terms of fertility behaviour and child survival, BRAC members tended to defer conception more than non-members during 1993-1995. The risk of death among children born during 1992-1995 also seemed to be somewhat lower among BRAC members than non-members.

In addition, a number of small-scale qualitative and quantitative studies were completed during the year and a series of working papers were published. The project received additional funds from The Ford

* Another paper was presented at the joint congress of the International Union of Anthropological and Ethnological Sciences (IUAES), the International Geographical Union (IGU), and the Environmental Policy and Society (EPOS), in cooperation with the Dept. of Water & Environmental Studies of the Institute of Tema Research, Linköping University, Sweden.

PHSD Foundation to carry out second-phase activities and a new research component on introducing reproductive health training to health care providers and BRAC members – financially supported by the International Center for Research on Women – has been included.

Improvement of health through a community development-oriented programme in rural Bangladesh

Project Director: Abbas Bhuiya

TA: Peter Eppler

Funded by: The Swiss Red Cross,
representing a consortium of the Swiss,
Dutch and German Red Cross societies

1996 was the third year of this project, which aims at the improvement of health through promotion of preventive measures and other relevant health initiatives by the traditional indigenous village-based self-help organisations in rural Bangladesh.

Training of male, female, and student volunteers on diarrhoea, water sanitation and hygiene, nutrition, and malaria continued. Volunteers also continued to disseminate messages in appropriate places – such dissemination activities being addressed more seriously by the female and student volunteers. Seven village health posts initiated by self-help organisations have been carrying out their activities, mainly growth monitoring and consultancy, at a very basic level. Simultaneously, they have themselves been trained in participatory impact monitoring.

Although it is too early to measure the health impact of this community-mobilisation exercise, community members are more aware now about health hazards and the demand for water-seal latrines has increased significantly. They are also more aware about existing government facilities in the area and are trying to utilise them. During the last National Immunisation Day, the coverage in the intervention unions was found, by an independent survey, to be the highest in the country.

Health and Demographic Surveillance Programme

Head: J. K. van Ginneken

Matlab Demographic Surveillance System (DSS)

Director: J. K. van Ginneken

Funded by: ODA, The Netherlands and the Centre

The DSS is a component of the Matlab Project that has been in operation since 1966, collecting data on vital events from a population that initially comprised some

140,000 people and is now about 210,000. It is unique in the sense that it is the only project in the developing world with continuous surveillance at the subnational level for a period of nearly 30 years.

Initial data collection is done by female Community Health Workers (CHWs) who visit each household every fortnight to provide family planning and health services. Their activities are verified by male Health Assistants (HAs) who accompany CHWs on monthly visits to households and record demographic information.

Vital event data are further checked before entry into ICDDR,B's large database in Dhaka. At this stage, the data are used to provide the key vital rates published in the Early Indicators series and in ICDDR,B's Annual Report. Additional data collection by the DSS includes the censuses of 1974, 1982, 1993, and 1996. Fieldwork for this last census took place at the end of 1996.

Demographic Surveillance System (DSS) Reports

Since its inception in 1966, DSS has produced an Annual Report detailing the demographic situation in Matlab. By the end of 1996, DSS Annual Reports for 1993, 1994, and 1995 had been published.

Early Indicator Series

Since the DSS Annual Reports are large, complex and somewhat difficult to understand, a brief report highlighting key demographic indicators is also produced. This 10-page report, "Demographic Surveillance System: Early Indicators, Matlab - 1995," was widely circulated in July 1996 among policy makers, various organisations and scientists in Bangladesh and abroad.

Distribution of data and research

Datasets derived from the DSS database were made available to a number of researchers worldwide. In addition, research projects using DSS data were undertaken by DSS staff members on selected topics in the broad area of levels, trends and determinants of fertility and mortality. (See Population Dynamics Table, p. 60).

Matlab Health and Socio-economic Survey

PIs: Nizam Khan (ICDDR,B),

O. Rahman (Harvard University & RAND) and
Jane Menken (University of Pennsylvania)

Funded by: National Institutes of Health, USA

Adults in approximately 2,700 "baris" and 5,000 households living in the DSS area were interviewed in the months of May–August. Data were collected on household composition and economy, labour force participa-

tion, fertility and contraception, adult health status, use of health services, migration and transfers of income, and goods and services to DSS households. The interviews were carried out by an outside organisation, which is also in charge of data cleaning, entry and editing. The information from the survey will be linked to already-existing information for the respondents of the survey derived from the DSS database. The whole dataset will then be assembled at the RAND Corporation and, together with proper documentation, will be released jointly by ICDDR,B and RAND as a public-use database in mid-1998.

Population Studies Centre (PSC)

Studies Director: R. Bairagi

Funded by: RAND, East-West Center,

The Ford Foundation and Centre funds

The Population Studies Centre (PSC) is the nucleus of ICDDR,B's population studies although other units, projects and programmes of the Centre also conduct operational and applied population research. PSC takes advantages of the unique population data and field setting in Matlab and other demographic surveillance areas of the Centre for basic and methodological work of national and international importance.

PSC prefers to undertake studies that are not usually possible, without the unusual and uncommon longitudinal data and field settings of the Centre. PSC scientists participate in different national and international conferences, seminars and workshops. They also help national organisations – particularly the Bangladesh Bureau of Statistics and Population Development and Evaluation Unit of the Planning Commission – and numerous international organisations in their demographic and statistical studies.

Contraceptive failure: Levels, trends and determinants in Matlab, Bangladesh

PI: R. Bairagi

Funded by: The Ford Foundation

This study investigated contraceptive use-failure rate, its levels, trends, and determinants in Matlab, Bangladesh, using a set of prospective data on 25,960 women of reproductive age. The life table technique and hazard model were used as analytical tools.

The results suggest that use-failure of most temporary methods increased from 1978 to 1988, but began to decline thereafter. In the cohort of 1990-94 acceptors the cumulative probability of first-method failure within 1 year of method acceptance was 12.9% for

pills, 2.0% for IUDs, 0.50% for injectables, and 22.0 for "other" temporary methods. If this failure rate is imposed on the national method mix observed in the 1993-94 Bangladesh DHS, it would appear that CPR needs to rise to 90% to achieve the fertility replacement level (NRR= 1), provided that there is no change in the current method mix pattern and other proximate determinants also remain invariant.

Some issues on estimation and demographic impact of contraceptive failure in Bangladesh

PI: R. Bairagi

Funded by: The Centre

It has been demonstrated that an estimate of the percentage of all births due to contraceptive failure itself does not tell much about the success or failure of a family planning program. Even so, it is a very important indicator that can help policy makers and program managers estimate the percentage of all births that can be reduced by optimizing contraceptive use. Longitudinal family planning and demographic data will be more useful than demographic survey data for estimating contraceptive failure in Bangladesh and other developing countries. If unchecked, contraceptive failure may rise to alarming proportions.

Levels, trends and determinants of child mortality in Matlab, Bangladesh, 1966-94

PI: R. Bairagi

Funded by: UNICEF

Matlab DSS data on the levels, trends and correlates of child mortality and causes of deaths of under-5 children in Matlab during 1966-94 were investigated.

In the Comparison area, mortality of under-5 children was more than 200 per 1,000 live births during 1966-75 with a 15% increase in 1971 and a 35% increase in 1975 due to the Liberation War and the 1974-75 famine respectively.

Then, during 1976-85, mortality returned to 200 and started to decline quite rapidly in the following years to about 135 in 1994. It is more than 25% lower in the MCH-FP area. Variables such as mother's education, birth interval, birth order, mother's age and sex of children have always been significant determinants of under-5 mortality but their importance has changed over the years.

Although the Matlab MCH-FP program was very successful in reducing infant and child mortality in the area, deaths in the 1-4 year age group due to causes other than tetanus in infancy or measles did not decline substantially during this period.

Population Dynamics in the Matlab Treatment area (served by the Centre's MCH-FP Program)
and in the Comparison area (served by the Government health services)

VITAL RATES (per 1,000)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Crude birth rate												
Treatment area	30.7	34.6	33.6	33.6	30.9	28.4	28.3	25.4	25.4	24.7	25.9	25.2
Comparison area	37.3	42.6	39.6	39.2	40.4	36.6	37.8	32.7	31.1	29.4	29.4	27.8
Total fertility rate^a												
Treatment area	4.0	4.5	4.3	4.2	3.8	3.4	3.4	3.0	3.0	2.9	3.0	2.9
Comparison area	5.1	6.0	5.5	5.4	5.4	4.9	5.0	4.3	4.0	3.8	3.8	3.6
Crude death rate												
Treatment area	13.4	10.2	9.9	9.3	8.7	8.0	7.6	8.1	8.3	7.7	8.0	7.3
Comparison area	17.3	14.2	12.2	11.2	11.0	9.5	9.4	10.2	9.8	10.2	9.2	8.4
Neonatal mortality rate^b												
Treatment area	57.9	52.5	45.4	43.8	42.8	46.0	47.8	47.7	49.6	42.8	36.4	30.6
Comparison area	71.4	69.4	53.0	54.9	57.7	52.7	53.3	63.2	53.3	64.5	56.4	50.3
Post-neonatal mortality rate^b												
Treatment area	56.9	33.8	36.4	34.6	38.0	28.3	27.4	32.3	30.8	20.3	27.3	20.6
Comparison area	55.7	49.1	39.7	39.5	39.0	38.0	34.1	51.7	37.0	34.8	30.8	28.3
Infant mortality rate^b												
Treatment area	114.8	86.4	81.8	78.4	80.8	74.3	75.2	80.0	80.5	63.1	63.7	51.1
Comparison area	127.1	118.4	92.7	94.4	96.6	90.7	87.5	114.9	90.2	99.3	87.2	78.6
Child mortality (1-4 yrs.)												
Treatment area	23.1	16.4	13.4	9.9	7.6	6.4	5.3	7.0	5.9	5.9	5.3	6.7
Comparison area	39.2	24.6	20.7	15.0	14.4	11.5	9.3	9.1	10.4	10.0	7.0	8.4
Rate of natural increase												
Treatment area	17.3	24.4	23.7	24.3	22.1	20.4	20.7	17.3	17.1	17.0	17.9	17.9
Comparison area	20.0	28.4	27.4	28.0	29.4	27.1	28.4	22.5	21.2	19.2	20.2	19.4

^a per woman ^b per 1,000 live births

See related text, p.58

Is son preference for children an obstacle to fertility transition in Bangladesh?

PI: R. Bairagi

Funded by: The Centre

Using the Matlab DSS and RKS data, the effects and the trends in the effects of gender preference on contraceptive use, abortion and fertility in Bangladesh were studied for a period when the country was passing through a demographic transition. During 1966-94, the total fertility rate declined from 7 in each area to less than 4 in the Comparison area and less than 3 in the MCH-FP intervention area.

The study reveals that gender preference had effects on contraceptive use, abortion and fertility in each area during this period. But what would happen if there were no gender preference?

There would probably be no more than an 8% increase in the contraceptive prevalence rate (CPR), but fertility might decline by more than 12% in the complete absence of gender preference. Of course, this fertility impact is much less than that estimated by Sheps in her pioneering work in the '60s. Gender preference had an effect on abortion, and the effect was relatively much higher than it was on CPR and on fertility.

The abortion ratio per 1,000 live births in the Comparison area was 21 during 1982-86 and 39 during 1987-91. In the MCH-FP area, the corresponding ratios were 16 and 25 respectively. But, in the absence of gender preference, it would have increased by about 36% in each period in the Comparison area, and 27% during 1982-86 and 36% during 1987-91 in the MCH-FP area. Unlike China and South Korea, there was no evidence in Matlab of sex-selective abortion or any increase in sex ratio at birth. Although the effect of gender preference on contraceptive use was small, its effect on fertility was substantial and was increasing. Its effect on abortion was very high and steps should be taken now to avoid disproportionate sex ratio at birth caused by sex-selective abortion.

Does a health project reduce excess female child mortality in a son-preferring society?

PI: R. Bairagi

Funded by: UNICEF.

This study investigated the levels and trends of the effects of son-preference on the mortality of 1-4 year-old Bangladeshi children to examine whether an MCH-FP program could bring about any change in rural areas. Data came from the DSS in Matlab, where an MCH-FP project was started in a 100,000 population in 1977-78, with another 100,000 population as the comparison area

where Government health services were available. A male to female mortality ratio of 1- to 4-year-old children was used as the main dependent variable.

The Matlab MCH-FP program was found to have successfully increased contraceptive use and decreased both fertility and infant and child mortality. Fertility started to decline in both areas in the mid-'70s and infant and child mortality in the '80s. Sex-ratio of child mortality started to improve first in the MCH-FP area and then in the Comparison area and rose from 0.6 in the '70s to 0.7 in the '90s – when the ratio in both areas became almost equal. The MCH-FP program was probably helpful, along with changes in society, in effecting a reduction in excess female child mortality. Yet, in the '90s, 35% of the female deaths in this area of children of 1-4 years were due to discrimination.

Fertility and its proximate determinants in Bangladesh: findings from the Bangladesh Demographic and Health Survey 1993-94

PI: R. Bairagi

Funded by: East-West Center

This study examines recent fertility levels, trends and determinants in Bangladesh, using data from the Bangladesh Demographic and Health Survey (BDHS) 1993-94. It also provides a critical review of the four principal proximate determinants of fertility and estimates their fertility-inhibiting effects, using the Bongaarts model. The analysis shows an appreciable rise in the proportion of the never-married and a fall in the proportion of currently-married women at early ages, indicating a rising trend in age-at-marriage. The duration of breastfeeding did not change much over the last two decades but the length of amenorrhoea is declining.

The national family planning programme has achieved remarkable success in a short period of time, attaining a CPR of 45% in 1993-94, which was only 7.7% in 1975. The analysis reveals that although the fertility-reducing effect of the marriage variable was increasing, its effect was offset by the decline in the duration of lactational amenorrhoea. Policy recommendations for further fertility reduction in Bangladesh were put forward.

Contraceptive use dynamics among limiters and spacers in Matlab, Bangladesh

PI: Abdur Razzaque,

Funded by: The Centre

This study examines contraceptive use and its continuation among limiters and spacers in the Treatment and Comparison areas of Matlab – the former being exposed to ICDDR,B's intensive MCH-FP program while the latter is served by the Government's national program.

PHSD The In-depth (1984) and KAP (1990) surveys of both areas, along with the service statistics of the treatment area, are used.

Between 1984 and 1990, contraceptive use increased 27.4% points among those in the Treatment area who wanted no more children and 23.3% points among those who wanted more, compared to 19.4% and 13.5% points in the Comparison area.

Desire for children and subsequent birth in Matlab: Does husband-wife agreement matter?

PI: Abdur Razzaque

Funded by: The Centre

The study investigates the role of reproductive preferences in predicting subsequent fertility up to 5 years in the treatment and comparison areas of Matlab. The three datasets used are: the In-depth Survey of 1984, the Socioeconomic Survey of 1982 and the 1984-89 DSS.

Births were found to be 13.8% higher than desired in the treatment area compared to 44.7% in the comparison area. Of the women wanting more children, 79.9 % in the treatment area and 84.2% in the comparison area subsequently gave birth while of those who wanted no more children 34.1% and 43.5%, respectively, gave birth.

Multivariate analysis found that wives wanting no more children with husbands wanting more were 2.74 times more likely to give birth. Wives wanting no more children, with husband's desire unknown, were 1.17 times more likely to give birth – compared to neither of a couple wanting any more children.

Sibling mortality in Bangladesh: age and cause-specific effects of older sibling's death

PI: Nurul Alam

Funded by: The Centre

This study examines whether mortality of two adjacent siblings in families is age- and cause-specific, and has been affected by the MCH-FP program and fertility and mortality declines in Matlab. Analyses included second and higher order singleton births during 1977-78, 1985-86 and 1989-90 in the Matlab treatment and comparison areas.

Logistic regression was used to estimate the effects of the survival status of elder siblings on the mortality of younger siblings in the neonatal, post-neonatal and toddler (12-35 months) periods (controlling for birth order, previous birth interval, maternal age, education and religion, household possessions and sex of the child).

Association between underlying causes of deaths of siblings was estimated for the later cohort using the multinomial logistic regression model.

Other major studies

Epidemiology of diarrhoea and ARI in a cohort of newborn in rural Bangladesh

PIs: Kh.Z. Hasan, R.B. Sack (JHU), A.K. Siddique, K.M.A. Aziz, J. Albert, L Unicomb, R. Huq and B.P. Pati

Funded by : USAID

A cohort of 288 newborn children was longitudinally followed at Mirzapur, Tangail district, for a period of 24 months to determine the aetiological agents of diarrhoeal diseases and the incidence and causes of acute lower respiratory tract infections (ALRI) particularly pneumonia. Morbidity surveillance of the study was completed in October 1996.

A 500-bed general hospital (Kumudini Hospital) located close to the study villages collaborated in the study. All ALRI patients particularly pneumonia and persistent diarrhoea patients, were hospitalised for detailed investigation and proper management.

Fresh stool microscopy was done at the Mirzapur field laboratory but samples for all microbiology and virology tests were sent to the Centre's labs daily. Birth weight was recorded for 280 children, 72% of which were recorded within 48 hours of delivery.

About 42% of the children had a birth weight of less than 2,500 gm. Colostrum was given to 29.2% of the newborn babies. Breastfeeding was continued for more than 88 of the children up to 18 months of age.

The incidence of ALRI was 0.35% per child per year. Sixty-seven percent of pneumonia occurred during first 6 months of life. Infant death rate was 86.8 per 1,000. Of all deaths among the infants, 64 died during the first 28 days of life. Birth asphyxia was the major cause of death in this neonatal period.

Health Systems Research Interest Group

Coordinator : M. Desmet

Health care use patterns of slum residents in Dhaka City, Bangladesh

PIs : M. Desmet, S. Zeitlyn and J. Myaux

Funded by : IDRC and BADC

This study, conducted in the field in 1993, aims to providing a comprehensive analysis of the health care-seeking behaviour of the slum population. The specific objectives, as a contribution to health policy, are to identify components of health care decision-making and to investigate the variables that contribute to it. There were 3 consecutive data collection phases, including key informant interviews with slum resi-

dents and practitioners working in the slums on aspects of health care decision-making; a 6-month longitudinal survey through fortnightly visits for illness episodes in 1,050 households; and case studies on specific health care-seeking behaviour. The study's final report was completed in December 1996.

Health care use patterns of non-slum residents in Dhaka City

PIs : M. Desmet & M. Siddiqi

Funded by: IDRC, BADC, UNICEF and the Dhaka Urban Community Health Programme

The above study on health care-seeking was replicated in the non-slum population. Comparison of findings from these 2 studies will provide valuable information on the health needs of differing populations in a large Third World city. Qualitative data collection, entry and analysis of the cognitive study have been completed. The longitudinal survey started on December 1, 1996.

Health care use patterns in the catchment area of the Gonoshasthya Kendra health care system in Savar and Gazipur thanas in Bangladesh

PIs : M. Desmet & A. Qasem Chowdhury

Funded by : IDRC, BADC & the Gonoshasthya Kendra

The catchment area of the Gonoshasthya Kendra health care system covers a semi-rural area of about 165,000 inhabitants. This study uses the same methodology as the two previous ones and will enable the investigation of rural-urban differentials in health care-seeking, as well as specifically address questions on willingness and ability-to-pay in this system, which has been gradually established over the past 25 years and includes a health insurance scheme.

Meta-analysis of the organisation and functioning on two health insurance schemes in Bangladesh

PIs : M. Desmet, A.Q. Chowdhury and Md K. Islam

This study was based on existing data of the Gonoshasthya Kendra health care programme in Savar and of the Grameen Health Programme, both of which have a health insurance scheme.

The purpose was to describe these schemes' technical performance and the level of community involvement in management, and to discuss these achievements in light of the schemes' potential roles as a mechanism in people's management of health care.

A paper was submitted and accepted for presentation at an international conference on health insurance in developing countries in Antwerp, Belgium.

Workshops:

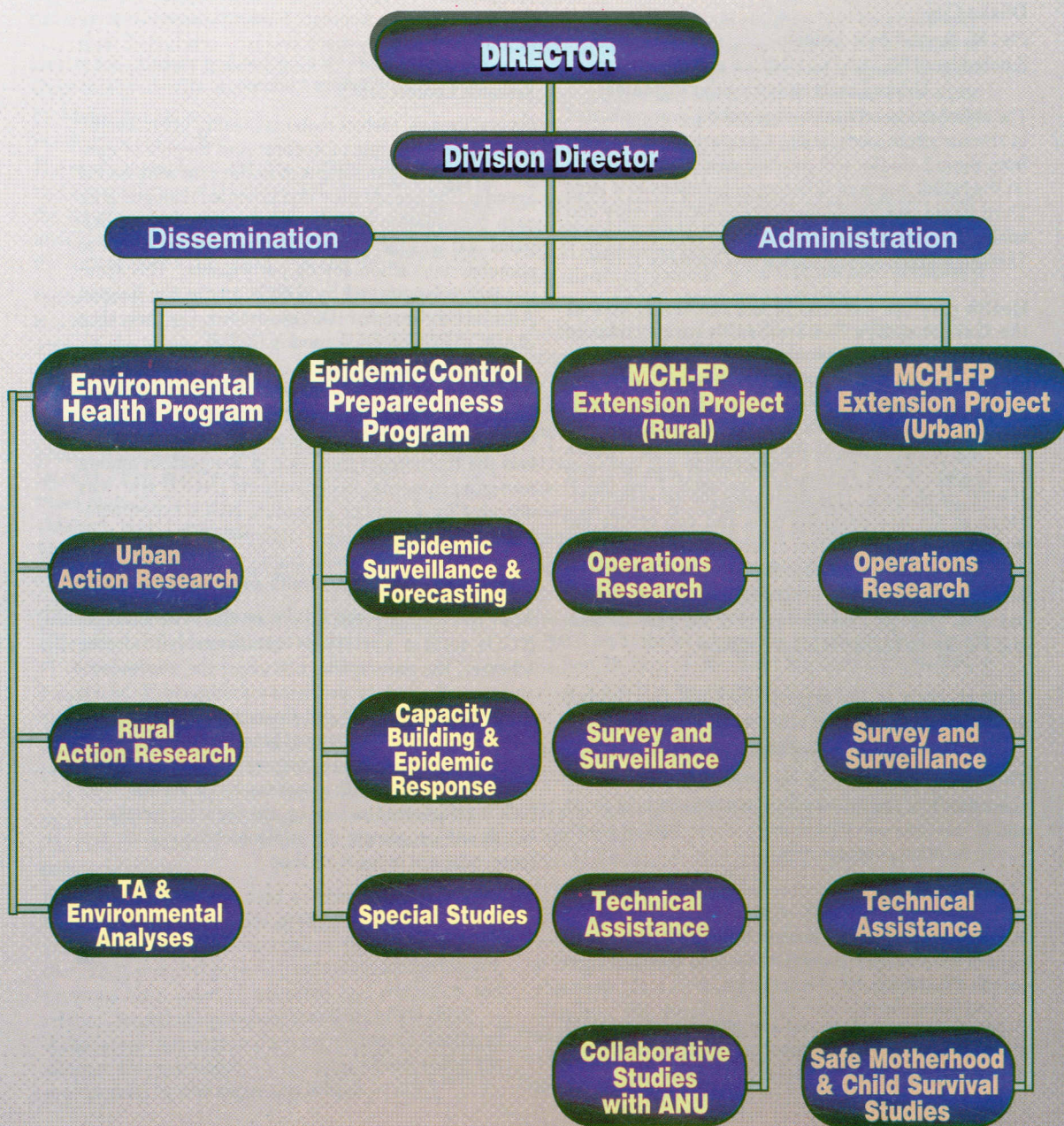
1. An international dissemination seminar, "Health Care Reform: User-Provider-Policy Maker Dialogue - A Regional Perspective," was organised on 4 and 5 August, 1996. Presentations were made by representatives from government and non-governmental organisations of India, Pakistan, Jordan and the host country Bangladesh. Delegates of international agencies also participated in the seminar. Findings presented were mainly on health systems research conducted with financial support of the International Development Research Centre (IDRC).

Several themes, such as maternal health, urban health, the situation and role of nursing, and the role of non-governmental organisations in health care were on the agenda. The agenda provided extended dialogue after each presentation between the speaker and participants and was recognised by all as very important to stimulate interaction among participants. This seminar was co-sponsored by IDRC-Canada, the Belgian Administration for Development Cooperation (BADC), UNICEF-Dhaka and ICDDR,B.

2. A two-day workshop on community-financing and health insurance was jointly organised with the Gonoshasthya Kendra on 16 and 17 November. This was the first one on this issue in Bangladesh among non-governmental organisations (NGO) and was attended by a number of leading NGOs experimenting with different modes of community-financing, and by members of the Health Economics Unit and other bodies of the Ministry of Health and Family Welfare.

After five formal presentations on the experiences of NGOs with a variety of community-financing schemes, the participants discussed the weaknesses and strengths and the problems encountered by NGOs in health care delivery and financing, including community-financing. A range of aspects dealing with the latter were defined, and strategies outlined to address them. Finally, the participants created a Forum. Two NGOs volunteered to take up the Forum's secretariat, which will coordinate the implementation of the recommendations of the workshop.

Health & Population Extension Division



HPED

Health & Population Extension Division

Division Director
Syed Shamim Ahsan

Subsequent to the reorganisation of the Division a year ago, the Division has gone through a productive year of transformation, consolidation and forward planning for the long-term agenda of the Division. However, the Division's primary mandate remains the same:

- ☐ to conduct operations research (OR) in health and family planning, including environmental health and epidemic control activities,
- ☐ scale up the research findings, provide technical assistance to GOB and NGOs to strengthen the national health and family planning program, and
- ☐ disseminate research findings to program managers and policy makers, locally and globally.

The Health & Population Extension Division (HPED) is the second-largest Division in the Centre with a total staff of 453, which includes 12 international-level senior staff, 5 International Fellows and 1 post-doctoral fellow. The Division consists of 4 Projects, a Dissemination Unit and an Administrative Unit.

Division Highlights

- ☐ Based on the progress of the Emergency Obstetric Care (EOC) initiative by the Rural Extension Project, the Government has announced its intention to gradually introduce comprehensive EOC in all the Thana Health Complexes (THCs) of the country and has asked the project to start the process by initiating EOC activities in five THCs in the country.
- ☐ Two consolidated *Intervention Update* booklets were widely distributed. The booklets contain summaries of ongoing OR activities and preliminary results of ongoing interventions.
- ☐ USAID has given the "sole source" for the entire operations research portfolio of USAID's next country project to the Centre. The Division is the designated executing entity for the next seven years (1997-2004) of the project period. With USAID's formal decision, the Division has embarked on an intensive planning exercise in close coordination with the Government and USAID to formulate the basic parameters of the Division's operations research (OR) for the next seven years. A new funding proposal will be in place upon completion of the current agreement in July 1997.
- ☐ The Urban Extension Project completed a substantive health and demographic profile of the urban population based on the Urban Surveillance System, 1991-1993 and the Bangladesh Health and Demographic Survey of 1993-1994 in collaboration with the Johns Hopkins University and the University of Dhaka.

Continued...

HPED The four programs are the Epidemic Control Preparedness Program (ECP), the Environmental Health Program (EHP), and the Urban and the Rural Extension Projects. Each program is headed by a senior scientist with a full set of research agenda, technical assistance and dissemination activities.

The Division's over arching research priority includes investigations into improving coverage in hard-to-reach geographical and low-performing areas, communities, and client groups through:

- * *innovative service delivery strategies;*
- * *improving service utilisation and quality through rationalisation of organisational structures, strengthening of management processes, development of quality assurance mechanisms and coordination of multi-sectoral services through government-NGO-private sector collaboration;*
- * *understanding the supply side of service delivery systems, quality of services provided, and economic issues involved, including cost recovery and sustainability;*
- * *understanding users' perspectives in order to increase the demand for health services;*
- * *understanding the health service needs of different sub-populations, such as newly wed couples, working women, slum populations, and women in their post-partum period;*
- * *developing simple, cost-effective and sustainable strategies for interrupting the transmission of enteric pathogens at the home and community level;*
- * *developing culturally acceptable strategies to promote improved personal hygiene practices, safe and adequate water supply, sanitation and sewage disposal systems; and*
- * *developing strategies to enable Government policy makers and service delivery program managers to apply research findings to the enhancement of health and family planning programs.*

Division Highlights

(Continued from previous page)

- ☐ The Urban Extension Project provided technical assistance in the development of the Asian Development Bank's (ADB) urban project. The possibility of allocating the operations research component of ADB's urban project to the Centre was discussed.
- ☐ Both the Rural and Urban Extension Projects have assisted the Government and the World Bank to develop and field test a basic health and family planning service package for possible replication in the Government's 5th Health and Population Project.
- ☐ The visiting World Bank Mission was briefed extensively about the operations research activities of the Centre, with particular focus on the Rural Project's activities. Detailed discussions were held with the World Bank about the possible role of the Centre in operations research aspects of the 5th Health and Population Project.
- ☐ The Division's operations research and extension activities have generated significant interest and support of the Government. The Government's commitment to the work of the Extension Projects has been considerable as demonstrated by visits to the Project sites by senior MOHFW officials.
- ☐ The Division has initiated a review process within the Division on a quarterly basis to ensure the scientific productivity and management efficiency of the Division.
- ☐ The Fourth International Workshop on Improving Effectiveness and Quality of Care through Operations Research for researchers from various countries of Africa and Asia was led by the Division scientists in coordination with the Training and Education Department of the Centre.

MCH-FP Extension Project (Rural)

Project Director: Prof. Barkat-e-Khuda

Funded by: USAID

The MCH-FP Extension Project (Rural) is a collaborative effort of the Ministry of Health and Family Welfare (MOHFW) and the Centre, with technical support from The Population Council. The overall purpose of the Project is to improve the effectiveness and efficiency of the national Family Planning and Maternal and Child Health (FP-MCH) program through operations research (OR), dissemination, and technical assistance (TA).

Operations research is carried out at several Government field sites: Abhoynagar Thana in Jessore District, Mirsarai, Patiya and Sitakundu Thanas in Chittagong District, and Sirajganj Sadar Thana in Sirajganj District. In addition, 10 rural thanas of Chittagong District serve as non-intensive laboratory areas.

The Project focuses on three areas of OR in the field of the national MCH-FP program:

- (1) improvement of management capability;
- (2) enhancing quality of care; and
- (3) promoting sustainability.

The Project shares its findings and experience with the Government, NGOs, and donors through meetings, workshops, seminars, and conferences. Findings are also widely disseminated through journals, working and briefing papers, and conference papers. Last year, the Project added a new dissemination tool in the form of a bi-annual Intervention Update, or a "flyer" on each ongoing intervention, including visits to the field.

Through the presence of its technical staff on various national committees and councils, the Project provides technical assistance to many Government and non-government agencies. Some of the national committees are: The National Population Council, headed by the Honourable Prime Minister; the National Steering Committee for Future Challenges in FP-MCH, and its various working groups; the National Committee for Implementation of the ICPD Program of Action; the GO-NGO Coordination Committee; and the Technical Advisory Committee of the 5th Health and Population Project.

Improvement of Management Capability

The Rural Extension Project has addressed some of the key management issues through improved record keeping, local level planning, and better monitoring and supervision, and coordination between the concerned agencies working in areas of health and family planning. The **District Approach** intervention of the Project is an

attempt to build the capacity of program managers and workers at all levels. It helps them to assess the program factors that influence accessibility to, and utilisation of, health and MCH-FP services.

On the basis of needs assessment studies in rural thanas of Chittagong, jointly conducted by the Project and MOHFW, the District Approach workshops in 1996 have enabled the district and thana level managers of Chittagong District to identify the strengths and weaknesses of their programs and assisted them in developing plans of action to: (1) improve client-worker contact; and (2) increase the utilisation of fixed-site service centres. During these workshops, the decision was made to scale up successful interventions from Mirsarai to other rural thanas of Chittagong under the Project's "District Approach" intervention.

The **Basic Health Service Delivery Package** was begun in July 1996, using the Systems Approach to address family planning, child survival, and other critical reproductive and basic health needs. These will be addressed at the community level through cluster spots, Satellite Clinics combined with EPI, and Health and Family Welfare Centers (H&FWCs) in two unions, one each at Abhoynagar Thana of Jessore District and Patiya thana of Chittagong District.

The Basic Service Package proposes an alternative form of service delivery involving a constellation of services and improved linkages between the various tiers of the health service system. The intervention coordinates joint delivery of services at the lowest level by health and family planning workers at fixed service sites called "Cluster Spots" to offer a wider range of services. An expanded version of the basic health service package is provided at higher levels of service delivery (i.e., Satellite Clinics and the H&FWC) for maximum utilisation, effectiveness, and clients' convenience.

A number of workshops were conducted in September through November 1996 with grassroots workers. Also, training was provided to service providers, paramedics, and frontline supervisors to follow the service delivery process and the record keeping, monitoring, and promotional activities of the intervention.

A **Health Assistant Register**, developed earlier to enable primary health care workers to perform more effectively and efficiently, was approved by MOHFW. The implementation of the HA Register at Abhoynagar, Mirsarai, and Sirajganj thana began in early 1996, and is still being field tested for nationwide implementation. A training curriculum and training materials have been developed, followed by the train-

HPED ing of Health Assistants and thana managers. A checklist to follow up the implementation process has also been prepared. Dissemination will follow the final evaluation for nationwide implementation.

Following MOHFW's earlier acceptance of the **FWA Register** as a useful tool in improving field workers' performance, nationwide distribution of the third edition of the FWA register has now been completed.

Strengthening the role of FPIs: an intervention to increase male involvement in family planning was introduced for field testing in Siddipasha union of Abhoynagar thana in September 1996. The overall objective of this intervention is to identify how the FPI, as the frontline supervisor of grassroots level family planning workers, can be used to: (1) organise community meetings to effectively involve males in family planning; (2) disseminate information to men about male family planning methods (condom and vasectomy), and STD prevention; and (3) identify key issues for the design of larger-scale intervention.

The FPI engages in two important activities: supervision and community mobilisation. However, the lack of accountability sometimes leads to less than satisfactory performance. Through this intervention, a system has been designed to establish accountability.

Another important activity assigned to the FPIs is to counsel and motivate men in rural communities to enhance method use by husbands and encourage them to be supportive to their partners' reproductive choices and method use. The FPI will also be expected to raise community participation and awareness on STDs/AIDS. A monitoring checklist for supervision of these activities has been developed and a reporting format for FPI activities is being finalised.

An intervention on varying the **Family Welfare Centre's (FWC) hours of operation** was initiated in August 1996 at Abhoynagar to facilitate use of FWC

services by scheduling alternative and convenient hours for the union's working population. A circular to this effect was issued by the Directorate of Family Planning in July 1996, and a client survey was also conducted. Abhoynagar thana managers and Project staff were consulted to determine appropriate implementation strategy. A questionnaire for use at exit interviews was developed and H&FWC supervision and monitoring sheets were implemented. Loudspeaker announcements, leaflet distribution, and announcements in the mosque during Friday congregational prayers were used as means to sensitise the union's population to the FWC's change of hours. Billboard messages are also being posted for further publicity. Monitoring will continue through bi-monthly meetings with thana officers and service statistics on clinic attendance.

The **Networking Intervention** of the Project, which started in the second quarter of this year, is an attempt to develop effective coordination among the different sectors of the Government and NGOs that provide family welfare services at the community level, to prevent duplication of efforts and to tap missed opportunities for service provision. It is an important effort toward improved program management and program sustainability. Thana and union level forums of several government family welfare service-providing agencies were formed in 2 thanas under the networking intervention.

The agencies are: Family Planning, Health, Education, Social Welfare, Agriculture, Cooperatives, Ansar, and Village Development Party (VDP). Their workers, as members of the Family Welfare Network Forum, hold monthly meetings at a common venue to plan family welfare service delivery and IEC activities. Thus far, Family Planning, Health, Agriculture, and BRDB (Bangladesh Rural Development Board) workers are delivering information and services from a common place. Initial findings suggest that service providers are encouraged by the bottom-up approach and the

Pictured below are activities of HPED's four major programmes: Shown here (below, left), a historic day for the Mirsarai Thana Health Complex as a proud and happy mother beams at her newborn child, Mirsarai's first Caesarean delivery. In Dhaka, the Urban programme helps DCC (Dhaka City Corporation) bring community members and Government officials together to plan and implement activities for more effective health and family planning services.



team spirit generated by collective activities. The Project continues to play an active role in providing technical assistance in scaling up its findings. **Interventions on Supervision and Monitoring** of field worker activities have been implemented in 12 thanas of Chittagong district where the Project provides technical assistance. **Performance planning and monitoring at the local level** – to improve planning mechanisms, introduce review mechanisms and the problem-solving process, and enhance quality of data – have been scaled up to all Project areas, including these 12 thanas.

The **MCH-FP Client Card**, developed by the Project, is under review by both the Director General, Family Planning and the Director General, Health Services for introduction into the national program. This pictorial multi-purpose card for client assistance features information and counselling on MCH-FP, immunisation, obstetric and other selected health care, and will replace the 5 cards previously used by providers and clients.

Improvement in the Quality of Care of MCH-FP Services

Concerted efforts by the Project's Quality of Care team to **Strengthen Maternal and Neonatal Health: Improving Linkages** at all levels have continued this year, with the objective of improving the quality and range of maternal and neonatal services at the thana level and below. In 1995 and then in 1996, the Mirsarai Thana Health Complex was upgraded to provide **Comprehensive Emergency Obstetric Care (EOC)**, including blood transfusion and caesarean sections. The first caesarean section in rural Bangladesh at the subdistrict level was successfully performed at the Mirsarai THC in June 1996. With the approval of MOHFW in July, the Abhoynagar THC is now being upgraded to provide comprehensive EOC. Based on the initial positive outcomes of this intervention, the Government has decided to provide comprehensive EOC at all thanas of the country in a phased-in man-

ner. Maternity patient admissions at the Mirsarai THC have increased from an average of about 15 clients per month to about 40 clients per month in the months following the upgrading of its EOC services.

During the Health Minister's visit to Mirsarai in October 1996, the Government sought the Project's partnership for scaling up its own EOC activities. The ministry has been directed to expand and replicate the Mirsarai EOC activities in five thanas – one in each of the five divisions of the country, with technical assistance to be provided by the Project. The Government's positive response to the Project's EOC initiative is an encouraging indication of the Centre's contribution in strengthening the health sector of Bangladesh.

Awareness-raising efforts through pictorial cards are being undertaken in the community to enable families anticipate an obstetric emergency and to save women's lives. The **Pictorial Card** also strengthens the FWA's role in MCH care. To complement this effort, a proper linkage and referral system at all levels has been designed. The pictorial card has been incorporated into the MCH-FP Card that is now being used in the third-generation FWA register.

A new multi-chamber **IUD sterilizer**, a modified version of the existing EPI steriliser, a small-size autoclave with three compartments for sterilizing IUD equipment, has been tested for wider applicability. The results show that it is easy to use, and ensures improved infection-prevention and control. MOHFW has approved its use in the national program.

In order to improve ante-natal care and reduce high-risk pregnancies, FWAs have instructions to motivate women to go to FWCs for proper checkups instead of expecting the FWAs to diagnose high-risk cases, because it has been found that FWAs are not qualified enough to make accurate diagnoses. On the other hand, the Project has found that the FWA, with proper training, can safely and effectively provide

(Below, left) Makeshift cholera treatment centres set up by ECPP reduce case fatality rates significantly during cholera epidemics. Shown below (right), rural women entrepreneurs in Singair Thana fabricate sanitary latrines, a high-priority demand item these days in both rural and urban areas, as a source of added family income.



HPED domiciliary injectable services, which can play a significant role in increasing CPR in Bangladesh. Also, as a result of this intervention, the Government has made a policy decision for safe disposal of used needles and syringes.

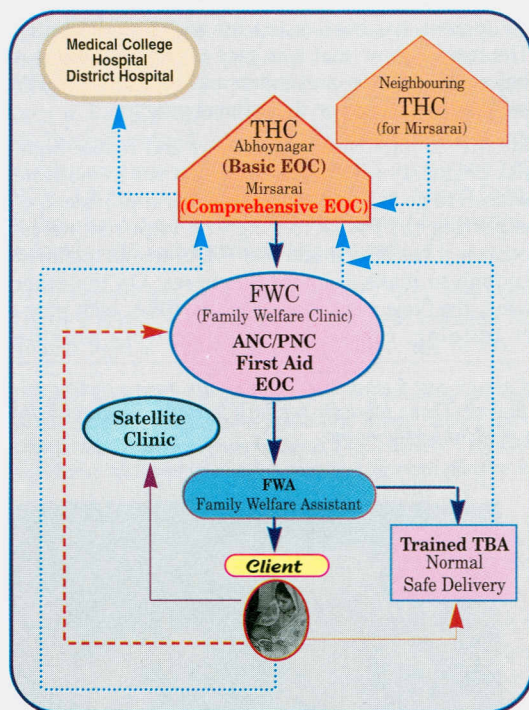
Promoting the Sustainability of the National MCH-FP Program

The MCH-FP Extension Project (Rural) has continued to design and test ways and means to reduce costs and make the National MCH-FP Program sustainable by reducing its dependence on external resources. As part of its efforts to provide an even wider range of services, the Project introduced the **Cluster Visitation Approach** intervention in January 1996 as an alternative to the existing Community-Based Distribution (CBD) system. The objective is to promote service-seeking behaviour among eligible women by encouraging them to come out of their homes to a fixed site in the neighbourhood for health and family planning services.

Early findings show that, contrary to initial misgivings about this innovative approach, CPR has not declined. A new perception of the cluster spot as the source of contraceptive supply is gaining wider acceptance among rural women in intervention areas. Inspired by these findings, this approach is already being replicated by several



Pictured above is a Family Welfare Assistant (FWA) as she conducts a health education session for rural women, which includes the promotion of a healthy child concept. This is part of the Basic Service Package (BSP) intervention under the MCH-FP (Rural) Programme.



large NGOs, and the Government is seriously considering its replication in the national program.

Strengthening outreach sites through the **Satellite Clinic combined with EPI centres approach**, which had started in 1995 continued through 1996. In two unions of Abhoynagar, 24 satellite clinic sessions were combined with 24 EPI spots. Similarly, in two unions of Mirsarai, 20 satellite clinic sessions are being held, 16 of which are combined with EPI spots. Two FWVs are working in each intervention area.

Although knowledge about satellite clinics has increased from 20% to over 90% since the intervention was introduced, awareness of services offered at those spots is relatively lower. The results from the previous year, indicating a three-fold increase in access and utilisation of services, have continued to hold true this year.

The Government's appreciation of this intervention is shown by the DG FP's decision to grant a waiver on the mandatory Monday Satellite Clinics to allow its smooth merging and functioning with the EPI spots – and by the Directorate's decision to replicate the combined SC+EPI Spot in the national program.

Another new concept, **Contraceptive Pricing**, was introduced for field testing in two intervention areas in August and September 1996 respectively. The objective of charging for services and supplies is to increase cost recovery and sustainability of the program, and

also to reduce dependence on external funding in the long run. The specific objectives are to get clients accustomed to paying user fees for MCH-FP services, to increase client use of fixed service-delivery outlets rather than at every doorstep – and to improve the quality of services at these outlets.

The intervention is designed to initiate fees in incremental phases, so that lessons can be learned in each phase. During the first phase, fees have been introduced for short- and medium-term methods (pills, condoms, and injectables) at the clients' homes and at the Satellite Clinics. Lower fees are being charged at the Satellite Clinics, and services at the FWC are free – to encourage poor clients to visit health facilities, thereby creating a cost-effective alternative to the home-based delivery approach.

In the second phase, fees will be added for selected MCH-FP services. In the evaluation planned for this intervention, results of the baseline and final surveys will be compared to assess the effect of contraceptive pricing on contraceptive use as well as on the quality of service-delivery. Initial observations indicate that the intervention is being well accepted and is unlikely to have any negative impact on contraceptive use.



Regular visitors to the FWCs are becoming increasingly health conscious and more informed about family planning alternatives open to them. Consequently, their health and happiness are also quite evident.

MCH-FP Extension Project (Urban)

Project Director: Abdullah H. Baqui
Funded by: USAID

In 1994 the MCH-FP Extension Project (Urban) began operations research to improve and strengthen the delivery of health and family planning services in urban areas.

This Project provides technical assistance to agencies of GOB and to urban NGOs and organises activities to disseminate lessons learned from operations research. These activities are part of a broadbased partnership of GOB, NGOs and ICDDR,B that is known as the "Urban MCH-FP Initiative."

The overall goal of the Project is to contribute to the reduction of mortality and fertility in urban areas.

The specific objectives are:

- to develop coordinated and cost-effective systems of delivering MCH-FP services to the urban population, initially in Dhaka, with a special focus on poor and slum populations;
- to disseminate project findings and provide technical assistance to adapt these systems to other urban areas of the country; and
- to enhance capabilities for planning, evaluation and implementation at the local level.

The Project activities cover three areas:

- a) Management Improvement and Technical Assistance;
- b) Improvement of Quality of Care; and
- c) Health Financing and Sustainability.

Each of these areas is managed by a team of researchers headed by a senior scientist. In addition, the Project has a Survey and Research Support (SRS) Team. This team provides necessary data and research support to design, monitor and evaluate various project interventions. During 1996 the Project continued to monitor and disseminate the effects of the interventions developed and implemented in the previous year. In addition, five new interventions were implemented. These deal with:

- * the development of alternative service delivery strategies;
- * the feasibility and implications of introducing a basic package of services in urban primary health care clinics managed by government agencies and NGOs;
- * the formulation of methodologies for equitable distribution of primary health care facilities in urban areas;
- * the development of cost management skills among service providers; and
- * the development of mechanisms that can guide service delivery organisations in establishing user fees for different MCH-FP services.

During this period, the Quality Improvement intervention was reformulated and was also introduced in two Government clinics in the Dhaka City Corporation (DCC) area.

HPED Operations Research on Management Improvement and Technical Assistance

During 1996 the Management Improvement Team (MIT) continued to conduct research activities, to implement interventions and to provide technical assistance to government agencies and NGOs towards strengthening service delivery systems in urban areas. In May 1996, as part of the intervention to improve planning of urban PHC services, the team recommended the creation of four national working groups of the Interministerial Urban EPI - PHC - FP Coordination Committee (IMC) to improve the coordination of health activities in urban areas. This recommendation was approved and followed up by IMC.

MIT assisted the Health Department of Dhaka City Corporation (DCC) to establish mechanisms to increase coordination among service providers in all ten zones of the City Corporation. A survey of NGO representatives, government officers and elected leaders conducted this year in Dhaka indicated that zonal committee meetings were regular and well attended and that the committees had played a major role in ensuring the success of such activities as the national immunisation days held that year.

Other assessments revealed that, in some zones, the committees were instrumental in the reorganisation of

services to increase the access of under-served slum populations to services such as immunisation and family planning. Recommendations to scale up the creation of these committees have been made to the central government and the lessons learned in Dhaka are already being implemented in other parts of the country. More than 60 municipalities reported activities of their Health and Family Planning Coordination Committees to the Local Government Division in 1996.

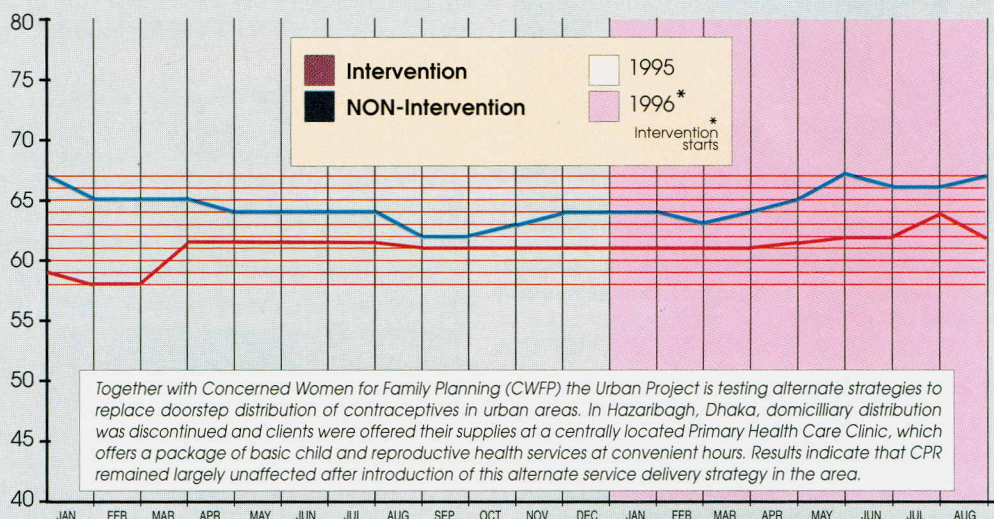
The team has continued to provide technical assistance to strengthen DCC's capacity to monitor local health conditions through workshops and training activities on information systems at the zonal level.

Clinic staff in three Directorate of Health Services dispensaries and 3 clinics operated by the Concerned Women for Family Planning (CWFP) were trained on protocols for the delivery of a **basic package of essential services** for child and reproductive health. Most protocols were adaptations from national guidelines and recommendations made by international organisations.

The protocol for the management of reproductive tract infections, however, was a more original design that emerged from consultations with relevant health care organisations working in Dhaka City. The team also began to introduce **supporting monitoring and supervision systems** for the implementation of the Basic

Testing alternative service delivery strategies: Contraceptive prevalence rates in intervention and comparison areas of Dhaka City

Source: Urban MCH-FP Extension Project



Services Package. Preliminary results from the clinics involved show that staff are applying the knowledge and skills learned earlier to the delivery of services.

The feasibility of introducing a card-based, client-oriented, **clinic record keeping system** continued to be tested in clinics operated by CWFP in two zones of Dhaka. Monitoring and evaluation activities indicated that screening and counselling for selected clinic services improved. The system also promoted better monitoring of quality in service delivery and helped supervisors in the identification of problems and solution to improve coverage of clinical services.

The **urban field workers' information system (UFI)** was tested in two areas served by CWFP. This system assisted field workers in developing work plans based on objective information and helped field supervisors with tools to monitor programme performance.

A joint evaluation of the UFI is currently being completed by staff from the team and CWFP. It is envisaged that this evaluation will help to design integrated information systems to link clinic and field operations and to support alternate service delivery strategies.

The team also completed a cross sectional survey in Zone 3 of Dhaka City Corporation on the Coverage of National Immunisation Days during 1996.

Operations Research on Quality of Care

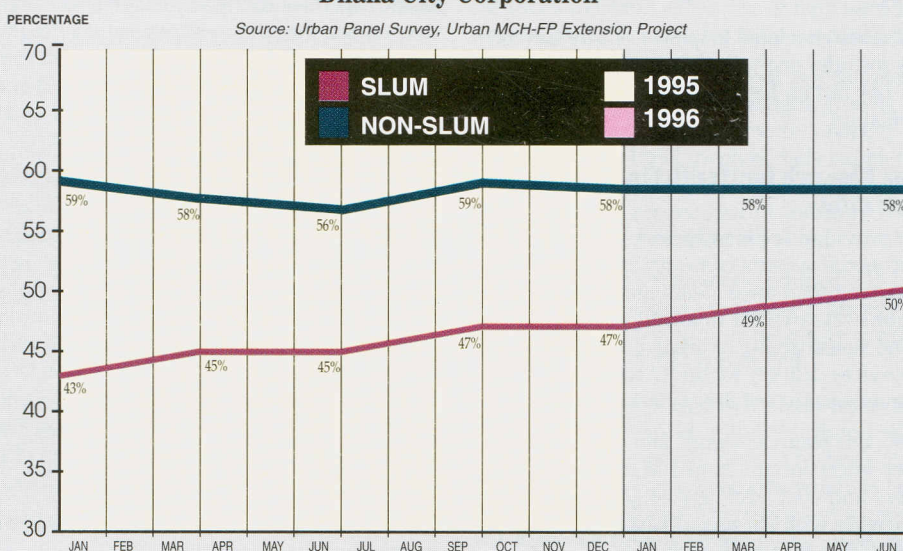
During 1996 the Quality of Care Team continued its work to assess the quality of MCH-FP services in Dhaka City, and to strengthen the capacity of NGO and government MCH-FP programs to implement quality improvement activities.

A **quality improvement** strategy for ongoing identification and solution of problems affecting service quality has been formulated in collaboration with the Association for Voluntary and Safe Contraception (AVSC). This strategy incorporates the Client-Oriented Provider-Efficient (COPE) methodology, originally developed by AVSC to identify problems related to quality of services in family planning clinics and to develop solutions to those problems. But it also includes elements of the Continuous Quality Improvement methodology being used in child survival programmes around the world.

In this strategy, all staff of the site gather with a facilitator for two to three days every six months to carry out a set of prescribed activities called **COPE Exercises**. The participants conduct a self-assessment, client interviews, and sometimes a client-flow analysis to identify problems affecting service quality. They then prepare a Quality Improvement Action Plan for addressing the problems they have identified.

Contraceptive Prevalence Rate Currently married women aged 10 - 49 Dhaka City Corporation

Source: Urban Panel Survey, Urban MCH-FP Extension Project



The COPE exercises are then followed by observations of service delivery and analysis of service statistics and other specially collected information. Solutions to other identified problems are incorporated into the Quality Improvement Action Plan. The strategy includes the formation of a Quality Improvement Team at the site level and a Quality Improvement Support Group at the central management level of the organisation.

The Quality Improvement Team is responsible for organizing quality improvement activities and for monitoring and supporting the implementation of the Quality Improvement Action Plan. The Quality Improvement Support Group is responsible for providing support to the Quality Improvement Teams.

Field-testing of this strategy began in May 1996 at two service delivery sites of the project's NGO partner, Concerned Women for Family Planning. The two groups of field staff participating in the intervention have already developed and are implementing a Quality Improvement Action Plan for their respective sites. Initial findings from this intervention will be available in July 1997.

Two working papers have been completed assessing the quality of MCH-FP activities, one concerning the quality of field worker activities and another concerning the quality of immunisation activities. A working paper concerning the quality of MCH-FP clinic activities is to be released in early 1997, along with a description of the team's experience with the development and measurement of a set of population-based MCH-FP quality indicators.

Additional research related to quality of care currently under way includes analysis of the cause of childhood death and risk factors for childhood death within the urban population.

Operations Research for Health Financing and Sustainability

This team provided leadership and technical assistance on economic aspects of health and family planning services in urban areas. Team members conducted operations research on financial allocation, cost recovery and sustainability of urban health and family planning services delivery for wider application in the cities and municipalities of Bangladesh.

During 1995, this team developed and began to implement three interventions aimed at enhancing cost-effectiveness and cost recovery of MCH-FP service delivery together with the project's NGO counterpart, Concerned Women for Family Planning.

The first intervention addressed an area of critical importance to the national MCH-FP program: the shift from **doorstep delivery of services to static facilities**. The team began to fieldtest strategies that encouraged the use of clinics, from which a range of basic services were made available.

Non-users of family planning services were motivated to obtain clinic services through targeted home visits and community-based communication strategies. The intervention's mid-term review shows that the alternative strategy was able to maintain stable program performance.

The second intervention included the **development of cost management skills** among field-level NGO program managers. The team conducted two workshops on orienting program managers on basic concepts of cost analysis and decision-making for allocative efficiency. A cost analysis tool was developed to assist managers to identify areas for cost reduction, and decide further on cost recovery measures.

Unit costs of different services in a basic package were determined through this process. The tool is currently being refined, together with a software program, for a larger network of service delivery organisations.

The third intervention dealt with the **development of mechanisms** to guide service delivery organisations in **establishing user fees** for different MCH-FP services. The intervention involved innovative research to develop tools for assessment of market price levels of other service providers and also to measure demand-related aspects of ability and willingness to pay for services among the catchment population. Program managers were then guided through workshops that allowed them to determine price levels through consideration of costs, consumer demand and market forces. This systematic process to conduct cost analysis and set price levels aimed to build local capacity and, in turn, ensure the sustainability of MCH-FP programs.

Key research conducted by the team during 1995 included an overall assessment of the health and demographic profile of the urban population of Bangladesh through secondary analysis of data from the 1993-1994 Bangladesh Demographic and Health Survey and the Urban Surveillance System (USS) of the Urban Health Extension Project of ICDDR,B from 1991-1993. The study was carried out in collaboration with the Johns Hopkins University School of Hygiene and Public Health and the University of Dhaka.

The key findings indicated the extent of urban poverty among the slum population, together with problems

of inadequate water and sanitation services, a high unmet need for family planning services, high incidence of unwanted pregnancies, low utilisation of antenatal and postnatal care, high prevalence of home deliveries, inadequate food supplementation for infants after six months of age, low coverage of immunisations, high prevalence of diarrhoea and ARI and high infant mortality.

These facts were further substantiated with qualitative assessments through a rapid appraisal study that described health needs and priorities according to the perspectives of urban dwellers' in Dhaka City.

The findings signalled the urgency of environmental problems, the need for special strategies to improve the health of the urban poor and the capacity and willingness of the urban population to pay for services. The implications highlight the role of the private sector in health service delivery and the need to empower local government to coordinate the diverse array of urban health resources. The team also published a paper on the participation of urban men in modern contraception and their attitudes, misconceptions and apprehensions about using condoms and undergoing vasectomies. These findings were disseminated at the Annual Scientific Conference of ICDDR,B, ASCON V.

Survey and Research Support

The quarterly collection of data included in the Urban Panel Survey (UPS) of Zone 3 of Dhaka City has continued during 1996. This survey provides community-based data to assist in the design, monitoring and evaluation of the Project's interventions. UPS is based on a multi-stage area sampling that includes approximately 2,500 slum and 3,500 non-slum households comprising a population of 31,000 persons.

The quarterly data collection of health and family planning information is complemented with special surveys to collect data on socio-economic indicators to monitor specific health conditions and to help evaluate the impact of service delivery strategies in the urban population.

During 1996 the following special studies were completed, using the UPS sample:

- (1) Community-based quality of care indicators and neonatal deaths;
- (2) Verbal autopsies to ascertain cause of death in under-5 children;
- (3) Assessment of nutritional status in under-5 children;
- (4) Immunisation coverage; and
- (5) The impact of National Immunisation Days.

Research Initiative for Safe-motherhood and Child-health (RISC)

PIs: G. Antelman, S.E. Arifeen, N. Fronczak, S. Osendarp, A. Sharma and K. Sabin

Funded by: The Royal Netherlands Government, with partial funding from USAID

Research Initiative for Safe-motherhood and Child-health (RISC) includes six studies addressing important issues regarding maternal and child health for the slum population. Two of the studies have been completed. The issues covered in the two studies are: early postpartum maternal morbidity; choice of delivery care provider; and determinants of birth weight, gestational age and perinatal mortality. Data collection of a third study on the effect of birth weight on infant mortality has also been completed.

Findings from these three studies identified short maternal stature, delivery with untrained attendant, and receipt of labour-inducing medicine as significant risk factors for perinatal mortality. Forty-five percent of the newborn weighed <2500 gms at birth, 79% were small-for-age and 8.6% were born before term.

Risk factors for intrauterine growth retardation included short maternal stature, prior "smaller than usual" birth, poor maternal nutritional status, night blindness, and third-trimester vaginal bleeding.

Risk factors for pre-term delivery were: maternal age <30 years, prior "smaller than usual" birth, and poor maternal nutritional status. Compared to heavier babies, the newborn weighing <2500 gms at birth were at almost 5 times a greater risk of dying in the neonatal period.

A fourth study on the effect of zinc supplementation during pregnancy on infant weight, growth, morbidity and immune response is currently ongoing. This double-blind clinical trial involves daily supplementation, birth weight measurement, blood sampling before and after delivery, assessment of immune response to BCG, and infant morbidity follow-up.

Of the 559 pregnant mothers recruited, 315 have given birth so far. Though a lot of data is already available, the double-blind nature of the study precludes any analysis before all data is collected.

In the fifth study, an educational intervention for improving care-seeking for childhood illnesses is being developed on the basis of findings from ethnographic studies. The intervention will then be tested in a part of urban Dhaka. The ethnographic component of the study has been completed. Most mothers seem to think of their child in terms of the following growth

HPED phases: the first 40 days, when mother and child are supposed to be confined and secluded; 40 days to 18 months, when the child begins to sit and walk; and above 18 months of age. This categorisation influences beliefs regarding both disease causation and care-seeking patterns.

No single symptom prompts care-seeking behavior. A combination of symptoms can prompt a number of mothers to seek care outside the home either immediately or within a day. Mothers, in consultation with neighbors, elders and trained "daies," usually make the care-seeking decision unless poverty or the husbands' lack of faith in her choice of practitioner stall their intentions.

The last ongoing RISC study is a cross-sectional study on the prevalence of sexually transmitted diseases in a sample of urban slum women and men. This study is based on the diagnosis of STDs by testing blood and urine samples from 1,534 randomly selected study participants. Laboratory work is currently progressing. Data collected show a positive culture of *Trichomonas vaginalis* in 2.1% of the tested samples.

Current hepatitis B infections were found in 4% of the samples. Almost 17% of the respondents reported symptoms suggestive of RTIs according to WHO syndromic management algorithms. Almost 50% of the men had ever visited commercial sex workers and 8.5% of the men had had sexual contacts with other men.

Epidemic Control Preparedness Program (ECPP)

Program Head: A.K. Siddique

Funded by: The Norwegian Agency for Development Cooperation (NORAD)

Cholera Epidemics in 1996

The incidence of cholera in an endemic country such as Bangladesh shows variations from year to year. Seasonal variations between different regions has also been observed. Like most of the communicable diseases, the cyclic periodicity of cholera epidemic is believed to span over a period between seven to nine years and is characterised by a period of rising frequencies and magnitude of cholera outbreaks followed by a gradual decline. The dry season cholera outbreaks in Bangladesh that usually occur in the southern and coastal districts, had an unusually low magnitude in 1996. However, between August and October, the heavy monsoon and flooding resulted in epidemic outbreaks in most of the northwestern districts. From January to November 1996, a total of

402,972 cases and 442 deaths were reported by the Government's epidemic surveillance.

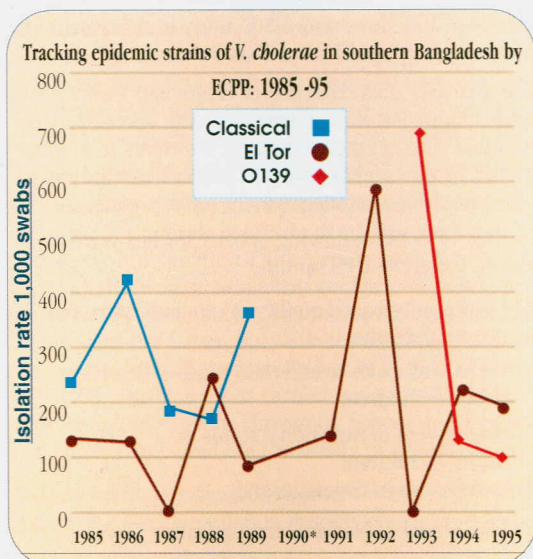
Investigations and interventions by ECPP

During the year, a total of 208,187 diarrhoea cases and 354 deaths occurred in the 17 worst epidemic-affected districts in different regions of the country. Nearly half (98,102) of the cases were reported from 6 northwestern districts (Nilphamari, Kurigram, Jaypurhat, Naogaon and Nawabganj). From the southeastern coastal districts of Laxmipur, Noakhali, Cox's Bazar and Bandarban, a further 38,424 cases were reported.

ECPP teams visited 23 thanas from 5 districts of the northwestern region. A systematic sample of 73 rectal swabs was collected from 379 suspected cholera patients identified and treated by the team.

Upon culture at the ICDDR,B laboratory, *vibrio cholerae* was isolated from 25% of the specimens. *Vibrio cholerae* O1, El Tor biotype was detected in four districts. However, in Naogaon district, which lies directly along the northeastern border of West Bengal (India), all positive isolates were *V. cholerae* O139.

Since the emergence of O139 in Bangladesh in 1992, this was the first time the strain was isolated from any districts of this region. In the southern districts, ECPP teams investigated outbreaks in 14 thanas in 3 districts. *V. cholerae* was isolated from 34% of the 38 rectal swabs collected. In contrast to 1993, when all the strains isolated from the coastal areas were *V. Cholerae* O139, the El Tor biotype of O1 serogroup accounted for 85% of the vibrios isolated during the last epidemic.



Monitoring Cholera in Sentinel Sites

ECPP conducted surveillance at 5 sentinel sites located at the Government health centres in different geographic spots in Bangladesh to find ways to improve the capabilities of Government surveillance for easy detection of cholera epidemics. Each month, a physician from ECPP visits these sites to conduct clinical and laboratory surveillance continuously for three days to detect cholera patients. A sample of rectal swabs is collected from acute watery diarrhoea patients attending the health centre for treatment.

A total of 424 rectal swabs were collected over a 10-month period. *V. cholerae* was isolated from 8.5% of the sample. Of the vibrios identified, 61% were El Tor Ogawa, 14% were El Tor Inaba and *V. cholerae* O139 were a quarter. Drug sensitivity patterns were tested for Tetracycline, Erythromycin, Co-trimoxazole and Furaxone. The O139 strains were sensitive against all these drugs, and the O1 strains against the first two.

Environmental Health Program (EHP)

Program Head: Dr. Bilqis Amin Hoque

Funded by: SDC, USAID, ADB, JHU and UNICEF

Recognizing that health, development and the environment are inseparably linked, the Centre created a separate Environmental Health Programme (EHP) in 1994. Focusing on multi-disciplinary activities such as environmental engineering, sociology, public health, laboratory science and management, EHP quickly evolved into a multi-faceted programme.



Sanitation in Dhaka's urban slums, primitive at best until recently, needs further improvement if the spread of disease is to be controlled.

The overall objective of the programme is to conduct and support environmental health research, mainly related to the control of diarrhoeal and infectious diseases in both rural and urban areas. EHP conducts both basic and action research and also responds to requests for technical assistance from Government and non-governmental agencies. Several NGOs have been included as partners in EHP action research projects. This partnership is designed to develop local resources, share the workload, and enhance the sustainability of project activities.

Action research and impact studies on community water, sanitation and hygiene education interventions in rural areas (in collaboration with the Department of Public Health Engineering and the Directorate of Primary Health Care).

The goal of this project is to strengthen the national capacity to provide water and sanitation facilities for rural areas, with particular emphasis on behavioural changes in sanitation and hygiene practices. The project is conducting applied research on further development of the Government's Social Mobilisation for Sanitation (SOC-MOB) Programme.

It is being implemented in Singair thana, Manikganj district, in collaboration with the Department of Public Health Engineering (DPHE) and two national NGOs: Concerned Women for Family Planning (CWFP) and PROSHIKA – and is approved by the Ministry of Local Government, Rural Development & Cooperatives (LGRD&C). Of the 11 unions in Singair, 5 have been randomly chosen for intervention and 5 for comparison.

Six monthly follow-up surveys on 3,200 randomly selected households in the intervention and comparison unions were conducted. Weekly diarrhoeal surveillance on 2,000 randomly selected households is continuing, along with routine water quality and handwash testing. In addition, a union water and sanitation committee (UWC) performance survey was conducted.

Special studies are also being conducted on the role and performance of local institutions, schools, women's groups, PROSHIKA and Government health workers in improving the WSHS situation. UWCs, comprised of elected representatives and other local leaders, have played a remarkable role after certain modification of the UWC's structure and terms of reference.

The water-seal latrine (WSL) coverage in intervention unions improved from 14.8% (May 95) to 42.4% (June 96) while it remained relatively static – at less than 15% – in the comparison unions. A majority (73%) of the ring-slab WSLs were purchased from NGOs who

HPED provided loans and allowed payment by installment. Findings of this project are now being considered at policy and programme levels.

Action research and impact studies on community water, sanitation and hygiene education interventions in urban areas (*in collaboration with the Dhaka City Corporation*).

Despite the urban bias in sector investment, effective water and sanitation coverage in the urban areas is lower than in rural areas. This generally results in depriving the urban poor of adequate water and sanitation coverage. In response to a Dhaka City Corporation (DCC) request, EHP is helping DCC conduct an action research project to address these problems in the slums of wards 41, 48, 59, 60 and 5 of Dhaka City. Situation and need analyses have been completed.

Planning and coordination with concerned agencies and the local community, social mobilisation and pilot-testing of selected technologies have been initiated. Meetings of newly formed Ward committees, chaired by Ward commissioners, are regularly being held. Some committees have initiated specific WSSH activities such as community-managed solid waste collection and disposal systems. Ward Commissioners have distributed leaflets to restaurants to promote food hygiene and have asked DCC officials to take action against those not conforming to proper food hygiene.

Environmental health intervention in selected poor areas of Dhaka City

Poor sanitation, insufficient and unsafe water supplies, poor personal and food hygiene and other household environmental factors are associated with

one-third of the global burden of diseases. The situation is more acute in slums, where only 30% of the slum dwellers have adequate access to piped water supply and 20% to sanitary latrines.

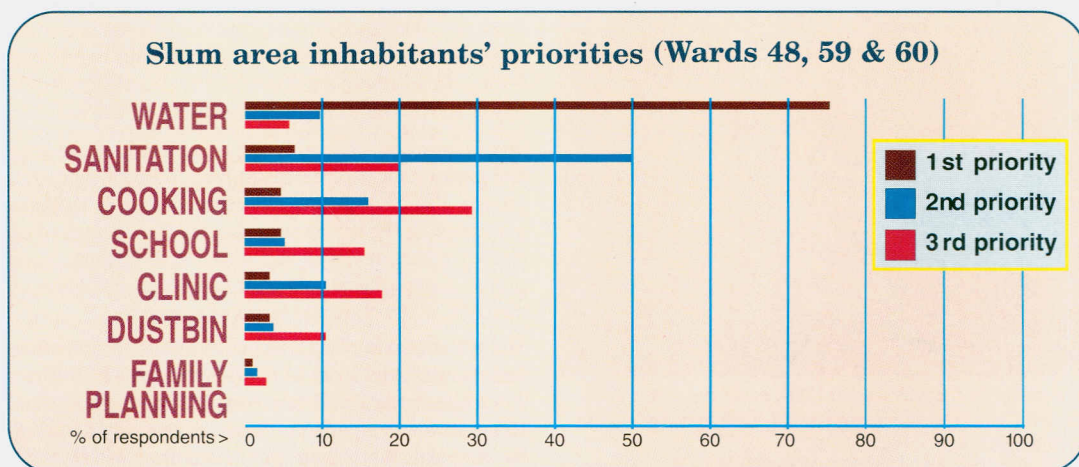
EHP has, therefore, initiated a research project to test two educational packages – one for permanent slums (Ward 5) and the other for temporary slums (Ward 48). A pre- and post-intervention cross-sectional design was adopted. Baseline and final surveys were conducted on 2,400 randomly selected households to measure WSSH knowledge, attitude and practice as well as the status of WSSH provisions.

Environmental sampling was carried out and local institutions (schools, mosques, restaurants, etc.) were surveyed. A training manual and a message card were developed and training was imparted to school teachers, religious and social leaders, NGO workers and women's groups. Project workers and these allies promoted WSSH messages through public meetings, courtyard meetings, focus group discussions, rallies, etc. Also, art competitions for women and children were held as a promotional tool and also to measure the effectiveness of the educational intervention programme.

Although these activities resulted in an appreciable rise in the knowledge of the slum dwellers, there was little change in actual practice – mainly due to lack of access to the proper WSSH facilities.

Water, sanitation, hygiene and health impacts of an integrated programme by GOB (DPHE) and UNICEF in Barisal

DPHE, in collaboration with UNICEF, undertook an integrated approach, during 1989-1991, to sanitation



improvement in 3 thanas of Barisal district, namely Gournadi, Banaripara and Agailjhara. In 1994, EHP was engaged by UNICEF to study the impacts of the project. Data collected from 2,690 families from these three thanas showed that about 70% used some kind of sanitary latrine. Knowledge related to the spread of diarrhoea remains poor, with only 10% of them being able to relate diarrhoea with safe water use, handwashing or other hygiene practices. Latrines were their highest priority, while safe water use and hygiene practices rated low on their listing of priorities.

Water quality and health situation analysis of the Meghna-Dhonagoda projects

The Meghna-Dhonagoda Irrigation Project (MDIP) is a medium-scale flood control, drainage and irrigation project located in Matlab. It covers an area of 17,584 hectares and forms a polder in the Meghna and Dhonagoda rivers. The Asian Development Bank (ADB) requested EHP to provide technical assistance to review specified health and water quality data related to MDIP.

EHP collected data from September 1994 to October 1995. Water samples were collected from tubewells, ponds, ditches, drainage and irrigation canals and tested for chemical oxygen demand (COD), biochemical oxygen demand (BOD), temperature, pH, salinity and conductivity. Prevalence rates of diarrhoea and skin disease and nutritional status of children were studied. Health, irrigation, drainage service and water-quality situations at the project were found to vary.

In general, the pollution level of surface water and the prevalence rate of diarrhoeal diseases were observed to be highest in places with the poorest irrigation and drainage services. The nutritional status of the chil-

dren was poor in these areas. It is recommended that water/sanitation interventions be introduced and monitored to study the long-term impacts of such projects.

The impact of exogenous technology on traditional resources management and the environment in rural Bangladesh

The objective of this study is to determine how pond management – as traditional resource management – responds to environmental change, mainly due to technological influence but also due to ecological impacts. This project was launched in October 1996.

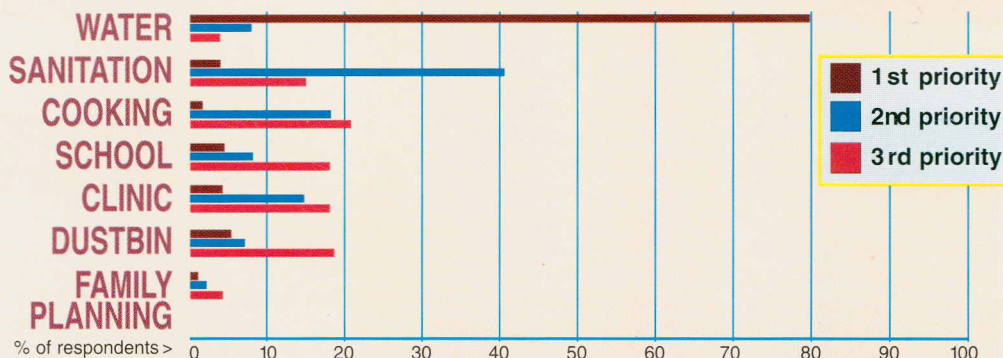
Environmental Laboratory

EHP maintains a full-fledged, in-house environmental laboratory to conduct various biochemical, physical, chemical and microbiological tests on environmental samples from research projects and external agencies. It has tested 11,800, 4,700 and 11 samples of water, handwash and water-purifying tablets respectively. Information on water quality of Dhaka City is being shared with MLGRD&C, Dhaka Water Supply and Sewerage Authority (WASA) and the Department of Environment, Government of Bangladesh.

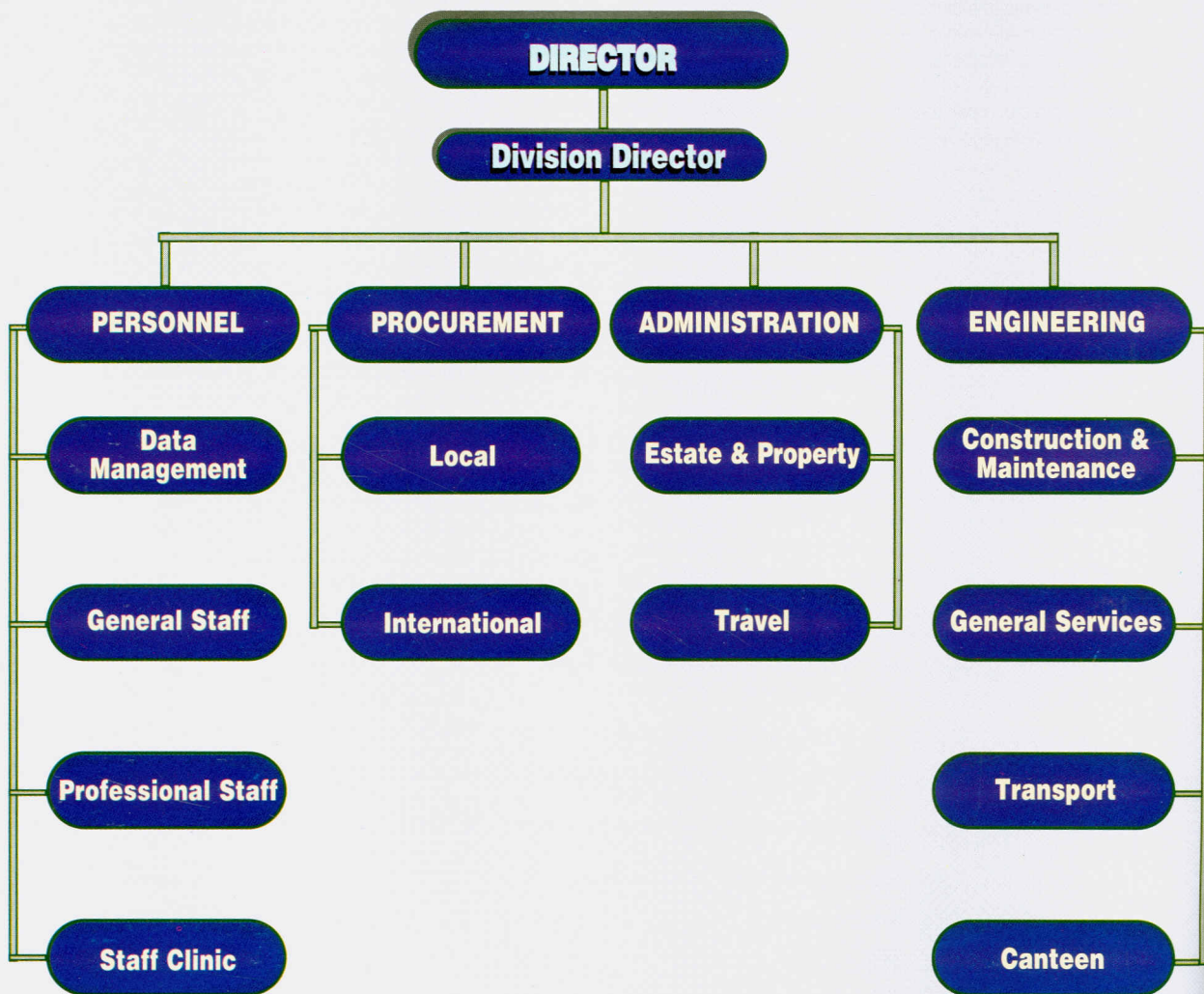
Global Applied Research Network (GARNET)

The Environmental Health Programme coordinates the Bangladesh chapter of the global networking forum popularly known as GARNET. More than 150 government, UN, NGO and donor agencies are members of GARNET and meet more or less quarterly. EHP coordinates workshops, meetings and special events such as the 2-day workshop, "Water and Sanitation Issues in Disaster Management" in 1996.

Non-slum area inhabitants' priorities (Wards 48, 59 & 60)



Administration & Personnel Division





Administration & Personnel Division

Division Director
M.A. Mahbub

The Administration and Personnel Division facilitates optimum use of human and physical resources of the Centre and provides logistic support to efforts to achieve the research, training, and service objectives of the Centre.

The Division comprises four branches:

Personnel

Procurement

General Administration

Engineering

Division Highlights

- ☐ New construction of 7,000 sq.ft. on the 2nd floor southwest wing of the existing hospital building was undertaken to increase office space and conference room facilities of the hospital. Around 700 rft. of boundary wall, along with barbed wire, was constructed to ensure proper security of the Centre, a new gatehouse was built at the north entrance of the Centre and car parking area was extended. Exterior weatherproof painting of all the buildings was completed.
- ☐ A new 2" dia WASA water pipeline was installed to resolve water shortage problems of the hospital and the Centre's laboratories.
- ☐ 107 new fire extinguishers were installed in different laboratories and offices of the Centre and a proper emergency exit and staircase was added to the Sasakawa Auditorium.
- ☐ The procurement system was computerised to provide updated information to requisitioners.
- ☐ "ICDDR,B News," the Centre's bi-monthly newsletter, was published by Personnel to provide staff-related information and also to highlight important activities and events at the Centre.

Personnel Branch

Chief Personnel Officer
Wahabuzzaman Ahmed

At the end of 1996, the Centre had 1,029 staff members in addition to 167 Community Health Workers and 82 Health Workers.

The Centre also had 32 international staff members, 15 of whom were on secondment, 161 were National Officers and 836 were in the General Services category.

Departures

Dr. James L. Ross (USA), Senior Scientist, Social & Behavioural Sciences Program, resigned in June 1996 to return to the United States. Dr. Ross was with the Centre for more than two years. **Dr. Sandra Laston (USA)**, Social Anthropologist in the Urban MCH-FP Extension Project, left the Centre in July on completion of her short-term assignment. Dr. Laston served the Centre for four years. **Mr. Graham A.N. Wright (UK)**, Associate Director, External Relations & Institutional Development, left

the Centre in November to join as the Rural Finance Adviser of a large EU-funded integrated agricultural project in Luzon, in the Philippines.

New Professional Staff

Dr. Josef Bogaerts (Belgium) joined the Laboratory Sciences Division as Senior Scientist in March. Dr. Bogaerts is on secondment from BADC for 2 years.

Dr. A.N. Alam (Bangladesh), Head of the Training & Education Department was offered a short-term assignment in May. Prior to this assignment he was on a consultant contract.

Dr. A.K.M. Siddique (Bangladesh), previously a National Officer category staff, joined as a fixed-term International Professional staff member in July as Epidemiologist in the Epidemic Control Preparedness Programme (ECP) under the Health & Population Extension Division.

Visitors & Consultants

During the year, the following consultants provided their expert services to different projects/programmes:

Dr. David Ross (UK/Canada), from the Maternal and Child Epidemiology Unit of London School of Hygiene & Tropical Medicine, visited the Centre in August to provide consultancy to the Community Health Division (now the Public Health Sciences Division), to observe the Matlab scientific studies operation and to join in discussions and planning for the restructuring of Matlab. **Mr. Shail Raj Shrestha** (Nepal), spent a couple of weeks at the Chakaria Community Health Project to help identify strategy to promote and sustain volunteerism and identify appropriate incentive mechanisms without making volunteers dependent on the project. **Dr. Dilip Mahalanabis** (India), former Division Director of the Clinical Sciences Division, made several visits to the Centre to complete his manuscript on micronutrients and amylase and to prepare and finalise manuscripts on zinc and other micronutrients.

A six-member team of Scientific Reviewers was invited by the Centre for a week in May to participate in a scientific review of the Laboratory Sciences Division and to prepare a report for the Board of Trustees of the Centre. They were:

Prof. V.I. Mathan (India), from the Department of Gastrointestinal Sciences, Christian Medical College Hospital; **Prof. James B. Kaper** (USA), University of Maryland School of Medicine; **Prof. Helena Makela**

(Finland), National Public Health Institute; **Prof. Fred S. Mhalu** (Tanzania), Department of Microbiology-Immunology, University of Dar Es Salam; and **Dr. Yoshifumi Takeda** (Japan), International Medical Center of Japan.

Ms. Gillian Duffy (UK), was at the Centre for more than a month to review the scientific achievements of the Centre during 1979-90 and its publications during 1979-95; and to discuss the key papers and achievements with the Centre's scientists. **Dr. Frank Eelens** (Belgium), from the Netherlands Interdisciplinary Demographics Institute (NIDI), visited the Centre in September and again in November to assist in the formulation of a proposal for a modernised system of Data Base Management System (DBMS) for the Demographic Survey System. **Mr. Brent Berwager** (USA), the Centre's Senior Development Officer stationed at the Child Health Foundation Office in Baltimore, visited the Centre to attend the Board of Trustees and the Donor Support Group meetings in November and to update planning for 1997 covering the activities of ERID in the absence of the Associate Director. **Dr. Alayne M. Adams** (Canada/USA), from the Harvard Centre for Population & Development Studies was again invited by the Centre for 2 weeks to provide technical assistance to the BRAC-ICDDR,B Matlab project.

Mr. Anthony Shillingford (UK), from the British Executive Services Overseas, once again visited the Centre to finalise a report on cost and management review of the Dhaka and Matlab hospitals and to conduct a detailed review and documentation of the CRSC and its systems/practices.

Ms. Juliette Bogaerts-Neilsen (Belgium), visited the Community Health Division to finalise data management and report writing on Maternal Death Audits & Female Deaths and to develop strategies to boost timely referrals of high-risk cases to EOC (Emergency Obstetric Care). **Ms. Sharon Huttly** (UK), from the London School of Hygiene & Tropical Medicine visited the Clinical Sciences Division to provide technical assistance to the study on the "Impact of Peer Counsellors on Infant Feeding Practices of Urban Mothers."

Dr. Barry Evans (UK), from the Communicable Disease Surveillance Centre, came in May for a week to review ICDDR,B's HIV testing policy and to prepare documents for discussion with the Board of Trustees.

Mr. M. Yahiya (Bangladesh), was again invited as a consultant to review the Chakaria Community Health Project activities and to make recommendations for

future directions. Dr. Pertti J. Pelto (USA), was at the Centre for nine months to assist in the training of Social & Behavioural Sciences Program researchers in advanced qualitative and quantitative methods.

The following experts were hired during the year on Contractual Service Agreements:

Ms. Sarah Coghlan (USA), was once again recruited for three months to provide editorial assistance in

preparing and editing the Centre's 1995 Annual Report. The Centre extended the contract of **Mr. Zahid Iqbal (USA)** by 11 months to continue editing scientific papers, project proposals and other Centre publications including the Centre's 1995 Annual Report. Toward the end of this period he was given another 6-month contract with sole responsibility for the editing, design and production of the 1996 Annual Report.

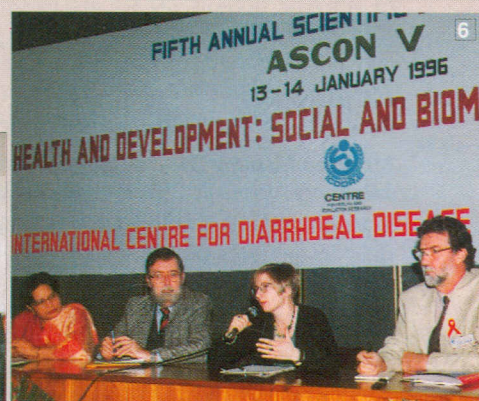


1996



Pictured (anti-clockwise) on this page are: 1. A group of WHO fellows making the rounds of the Centre's wards as part of their training. 2. A group of SAARC fellows also engage in bedside learning. 3. An Iranian delegation of senior health officials observe the management of diarrhoeal patients at the Centre's hospital. 4. Al-haj A.H.M. Fowzie, Sri Lanka's Minister for Health, tours the Centre's wards. 5. H.E. Mr. Kenneth Aspinall, former High Commissioner of Australia, hands over his country's 1996 contribution to the Centre to Dr. D. Habte while Centre staff look on. 6. The 5th ASCON session, an international gathering of scientists, is seen in progress. 7. Prof. Fred Mhalu of Tanzania is seen sharing a memento presented to him with Maj. Gen. (Retd.) M.R. Choudhury and Dr. Maureen Law, BOT Chairperson. 8. Dr. Walter Meyer of SDC (extreme right) at a meeting of the National Task Force on Action Research and impact studies on community WSSH interventions in Bangladesh. 9. Her Excellency Ms. Renee Veyret of France holds a tiny patient while chatting with the mother.

Snapshots



A&P

Retirement

Nine staff members retired from the Centre during the year. They are:

Mr. Asit Baran Saha,
Aid Nurse, DTC Matlab, CHD.

Mr. Khalilur Rahman,
Assistant Supervisor, Matlab DSS, CHD

Mr. Delwar Hossain,
Laboratory Technician, Clinical Microbiology, LSD.

Mr. Sk. Md. Lutfur Rahman,
Master Mason, Maintenance, A&P.

Mr. Siddiqur Rahman Patwary,
Health Assistant, Matlab HRC, CHD.

Mr. A.K.M. Golam Kibriya,
Senior Scientific Officer, Clinical Microbiology, LSD.

Dr. Md. Rafiqul Islam,
Senior Scientist, CRSC, CSD.

Mr. Md. Joynal Abedin,
Mechanic, Matlab Administration, CHD.

Mr. Mir Mahiuddin,
Senior Coordination Officer, Director's Bureau.

Long Service Award: **30** years

During 1996 twelve staff members completed 30 years of service in the Centre and were awarded meritorious increase in pay. They are :

Mr. Md. Sirajul Haque,
Senior Health Assistant, DSS Matlab, CHD;

Mr. Mahfuzul Islam,
Field Research Officer, MHRC, CHD;

Mr. Abdul Momin,
Storeroom Attendant, Finance;

Mr. K.M.A. Rouf,
Procurement Officer, Procurement Office, A&P;

Mr. Md. Yunus Howlader,
Senior Laboratory Attendant, Clinical Lab, LSD;

Mr. Jalaluddin,
Cabinet Maker, Maintenance & Engineering Branch, A&P;

Mr. Jiban Chandra Das,
Laboratory Attendant, Clinical Pathology, LSD;

Mr. Md. Abdul Latif Patwary,
Senior Health Assistant, DSS Matlab, CHD;

Mr. Ali Miah,
Animal Attendant, ARB, LSD;

Mr. Md. Delwar Hossain,
Store Room Attendant, Procurement Office, A&P;

Mr. Md. Kashem Ali,
Senior Health Assistant, MHRC, CHD; and

Mr. Md. Mokhlesur Rahman Khan,
Senior Laboratory Technician, Clinical Biochemistry, LSD.

OBITUARIES

With deep sorrow we record the deaths of the following staff members who served the Centre for many years:

Gita Rani Das (45)

Community Health Worker, Matlab MCH-FP, Community Health Division. She served the Centre for more than 18 years.

Mrs. Nurjahan Momin Nina (46)

Office Manager, Social & Behavioural Sciences Program, Community Health Division. She served the Centre for 2 years.

Separation by Mutual Agreement

Thirteen staff members who sought separation by mutual agreement were released during the year:

Mr. Md. Sohrab Uddin Bhuiyan, Driver, Transport Office, A&P; **Mrs. Mary Dias,** Telephone Operator, A&P; **Mr. Md. Shakhawat Hossain Khan,** Security Foreman, GSU, A&P; **Mr. Gabriel Gomes,** Senior Animal Attendant, ARB, LSD; **Dr. M.M. Hoque Munshi,** Assistant Scientist, HPED; **Ms. Zubaida Khatun Chowdhury,** Coding Assistant, Rural MCH-FP Extension Project, HPED; **Ms. Lutfun Nahar,** Assistant Staff Nurse, CRSC, CSD; **Mr. Md. Shafiullah,** Assistant Mechanic, MHRC, CHD; **Mr. Md. A. Majid Khan,** Secretary Gr-I, CCHP, CHD; **Mr. A.I. Chowdhury,** Research Fellow, Matlab MCH-FP, CHD; **Mr. Md. Mujibur Rahman,** Senior Estate Officer, A&P; **Mr. Shamsul Islam,** Security Guard, GSU, A&P; and **Mr. S.M. Iqbal,** Computer Engineer, CIS, Finance.

Staff Clinic

Physician Manager: Md. Matiur Rahman

The Staff Clinic continued to provide improved health care to the staff members and their dependents during 1996. A total of 21,857 patients were seen and 515 were vaccinated. Of these, 111 were emergency cases, 519 required minor surgery, 103 were hospitalised, 119 had ECGs done and 13 had cervical smears taken. Another 585 were provided family planning services, 19 underwent periodical examinations and 72 were given pre-employment examinations. The clinic also conducted nine health education seminars to create health awareness among staff members and their dependents.

Procurement Branch

Procurement Manager: Mahbubul Alam

This branch is responsible for procuring scientific and other materials for the Centre through local and overseas purchase for smooth and efficient support to the Centre's research and related activities. During 1996 the efforts of the branch resulted in timely procurement and placement of orders worth US\$ 2.21 million – out of which US\$ 0.96 million was spent for local purchase and US\$ 1.25 million for overseas purchase.

The branch received a new Customs Pass Book for the Centre and completed the periodical Rate Running Contract, minimizing cost and reducing lead time and also completed enlistment of vendors for the year 1997. The branch now has a computerised procurement system with updated information for requisitioners.



Life has been one long ferry-tale for speedboat driver Osiur Rahman, who has been at the helm of the Matlab hospital's marine ambulance service since 1966 – thirty long years!

Administration Branch

This branch is comprised of the Estate and Travel offices, headed by Mr. Mujibur Rahman and Mr. Shafiqul Hossain, respectively. During 1966 the Travel Office obtained a variety of Bangladesh visas for Centre personnel, consultants and visitors as well as foreign visas for those going abroad. Net profit from the Centre's guest house was US \$ 27, 071.

Engineering & Maintenance

Manager : Taqsem A. Khan

During 1996 this branch ensured proper maintenance and development of the physical facilities of the Centre. Besides civil construction, renovation and maintenance of electrical devices, it also coordinated security and cleaning services, transport and logistics support, vehicle maintenance and the staff canteen.

Civil Engineering

Assistant Engineer: Rabindra Das

In 1966 this unit completed the construction and renovation projects listed under Division Highlights.

Electrical Engineering

Supervisor: Azizul Hoque

Routine maintenance of all electrical appliances and devices, including a 800 KVA generator and electrical sub-station, was conducted.

Vehicle Maintenance

Sr. Asst. Engineer: M.A.H. Talukder

This section routinely performed the checkup, servicing and repair of all 78 vehicles of the Centre.

General Services

GSO: A.M. Alamgir

General Services continued to provide services for the safety and security, cleaning, mail, and conference management of the Centre. The section also installed 107 new fire extinguishers, refilled 25, and conducted refresher fire-fighting training for staff.

Transport Management

Transport Officer: Md. Hamidullah

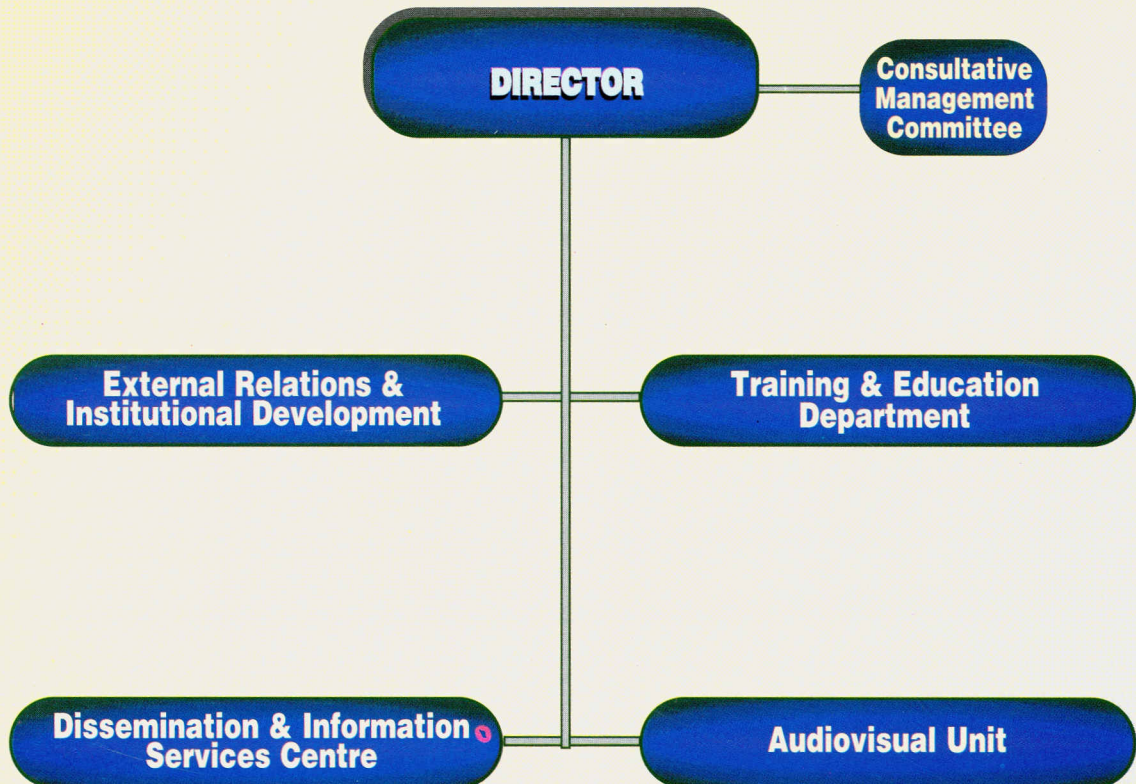
This office undertakes logistic support activities by coordinating the use of the Centre's 78 (and 11 leased) vehicles. Four new vehicles were added to the fleet during the year. The radio-communication system between Dhaka and Matlab has worked effectively.

Staff Canteen

Supervisor: Md. Abdullah

As usual, the canteen continued to prepare and serve wholesome food to Centre staff and hospital patients.

Director's Bureau





Director's Bureau

The Director's Bureau is the Centre's direct interface with the outside world. It runs the training programme and the committees established to maintain ICDDR,B as a centre of excellence and also strives to optimise communication, dissemination and information exchange.

The External Relations and Institutional Development office is charged with coordinating fundraising efforts, corporate communication, organisational planning and development, and grant management. The Training and Education Department coordinates the Centre's extensive training, fellowship, and staff development programmes. The Dissemination and Information Services Centre runs the library and publications sections. The Audio Visual Unit does the artwork and illustrations for the Centre's publications. The Mandatory Committees comprise the Board of Trustees, and the Research Review, Ethical Review and Animal Experimentation Ethics committees.



Pictured here are: (top left) Ms. Liisa Palme, VP Marketing, Rhone Poulenc, Paris, at the Centre's Nutrition Rehabilitation Unit (NRU) in Dhaka. (Right) Dr. Maureen Law, Chairperson of the Board of Trustees, as she listens to Dr. Habte describe newly set up posters. And (below) a view of some of the members at the Board of Trustees meeting held at the Centre in November.

External Relations & Institutional Development (ER&ID)

The External Relations and Institutional Development (ER&ID) Office has made great progress and has had a number of successes. It continued to implement the activities planned for 1996:

Activities in Bangladesh

Mr. Graham Wright, Associate Director of ER&ID, left the Centre in November 1996 to join as the Rural Finance Adviser of a large EU-funded integrated agricultural project in Luzon, in The Philippines. Mr. Wright was an outstanding member of the Centre management and made an immense contribution to the growth of the Centre and its activities. He designed and helped implement the Centre's resource development strategy. The Centre's funding base has been broadened during his tenure, including the launching of two Endowment Funds. Overall, the response to the need to change the way the Centre goes about searching for funds has been excellent, and Graham Wright can take a large part of that credit.

Preparation of Project Proposals

This activity was dominated by efforts to develop the "Bangladesh Health Action Research Project" into a proposal that is acceptable to the European Union. A decision is still pending. During the period, ER&ID completed the preparation, negotiation and passage of the USAID/Washington Cooperative Agreement (CA) for \$5.8 million over five years.

ER&ID prepared, submitted and got the approval to receive **\$1.39 million from Japan**. The contribution includes the 1996 annual grant of US\$680,000 and an additional US\$710,000 for construction of the physical facilities of the International Family Planning Training Centre at Matlab. This makes Japan the second-largest donor to the Centre.

ER&ID also prepared the institutional components of the SAREC proposal and coordinated the preparation of the research components; completed formalities for the ODA core grant for 1995 (\$275,000) and the computer systems project (\$465,000), and prepared proposals for the Nippon Foundation (\$2.5 million for five years) and KOICA.

The office continued to follow up with the Arab Gulf Fund, and submitted four project proposals for 1994 Phase VI (\$450,000), for 1995 Phase VII (3 proposals for \$100,000 each), and for 1996 Phase VIII (3 proposals for \$100,000 each). An agreement was signed between IDRC and the Centre.

IDRC's Pan Asia Networking (PAN) programme will make available disk space on its Web server to the Centre to enable us to share valuable information and resources with the research and development community on the Internet.

A 15-page submission was prepared and delivered as part of a formal application for the \$1 million Conrad Hilton Humanitarian prize (see under North America office). A 3-year project proposal for core and project funding for the 1997-99 period was submitted to The Netherlands Embassy. A five-year project proposal was submitted to UNDP. The Centre requested that UNDP continue its unrestricted institutional support for the Centre for another 5 years (1997-2001).

Similarly, a five-year project proposal for institutional support was also submitted to the **Kingdom of Saudi Arabia (KSA)**. A 5-year grant agreement for US\$2,517,683 was signed recently with NIH. This NIH grant is for the project entitled, "Epidemiology and Ecology of *Vibrio cholerae* in Bangladesh" and comes through a subcontract with **The Johns Hopkins University**. A project proposal for continued funding of the Centre's Epidemic Control Preparedness Programme (ECP) for the period 1997-99 has been sent for NORAD's consideration and approval. In addition, the following proposals were submitted: Preventive and Rehabilitation Activities in a Diarrhoea Treatment Centre, the ORT Corner of the Hospital, and for the Centre's Hospital Endowment Fund. The annual project proposal for the 1997 AusAID fund was prepared and sent. In addition, three project proposals for the Dhaka hospital's Short-Stay Ward, Outpatient Unit at Matlab, and Training Linkage were also submitted for consideration.

Finally, expert volunteers are being identified and recruited in collaboration with British Executive Services Overseas (BESO). Mr. Anthony Shillingford continues to look at the cost and management of the Centre's Dhaka and Matlab hospitals. In addition, Ms. Gillian Duffy arrived to help the Centre with the preparation of "Scientific Achievements 1990-95" and to assist the publications section of DISC.

The Centre submitted a proposal to the **Ford Foundation** for a "wasting" grant to support and complete the institutionalisation of the social sciences within the Centre. This is an application for a multi-year foundation support for \$1,000,000 from January 1997. ER&ID has continued the Centre's efforts to diversify its funding base, and to liaise with SAARC, ASEAN, and countries involved in the establishment of the Centre in Geneva in 1978.

Sri Lanka has once again made its annual contribution and, in fact, raised its annual contribution for 1996.

The Honourable Prime Minister's Visit

ER&ID played a key role in the planning and implementation of the visit of the Honourable Prime Minister of Bangladesh Sheikh Hasina to the Centre on 22 December 1996. A special poster presentation was arranged by ER&ID on this occasion.

Bangladesh, as the host government, increased its regular annual contribution to the Centre to \$250,000. In addition, a one-off contribution of \$500,000 was given for unrestricted expenditures.

Hospital Endowment Fund Campaign

To continue the Hospital Endowment Fund efforts, a series of committees have been organised. The Hospital Endowment Committee (HEC) is meant to be the engine for the HEF campaign and is chaired by Maj. Gen. (Retd.) M.R. Choudhury.

The other committees complementing the efforts of HEC are: the Council of Investment Advisors, the Council of Goodwill Ambassadors, the External Relations Committee, the Events Committee, and the Income-generating Committee.

ER&ID is coordinating all these hospital endowment fund activities. It has already produced and circulated a 4-page case statement and its 2-page executive summary. ER&ID produced a brochure and an appeal poster which have been extensively distributed. It has also spearheaded a media blitz and accordingly all the leading national dailies, radio, and television were routinely fed with news on the endowment campaign.

It produced information packs for visitors and put together special folders to introduce the campaign to potential Goodwill Ambassadors. It also worked with the American International School, Dhaka to organise a concert to raise funds.

The Committee is also liaising with Beximco Pharma's Multimedia Division to produce a video to be shown on television to promote the hospital's successes. It also assisted the Events Committee to organise the Annual Dinner on 21 November at the Sheraton Hotel.

The Committee is also at work to erect "**Honour Boards**" to recognise large contributions to the campaign. These Honour Boards would record the contributions made by donors (either individuals or corporations) in six different categories starting with gifts of Tk. 10,000 all the way up to gifts in amounts of Tk. 500,001 or more.

The Council of Investment Advisors received legal opinion that the Hospital Endowment Fund is a Trust Fund that can invest in shares and debentures. Furthermore, it has been deemed to be both a foreign and local investor, which has given it great opportunities to subscribe to initial public offerings prior to their coming onto the open market.

To date, the fund's investments in shares have made a gain of 41% over cost. To date, the Hospital Endowment Fund has reached \$4 million. The target is to raise \$10 million by the year 2000.

Grants Administration

The Technical Cooperation Office was active to ensure that the terms and conditions of grants are acceptable to the Centre and are in the Centre's interests. These paralegal reviews are made of each grant before agreements are signed. A special seminar on the USAID regulations was organised for PIs to promote compliance of requirements.

The grants administration database is running successfully. Status reports of financial and technical reports are produced every month and are distributed by ER&ID to the Centre management for review. This has resulted in a much improved donor reporting system.

Communication

The ER&ID Office was closely involved in the production of the 1995 Annual Report, and the "Proceedings of the Donors' Support Group Meeting – November 1995." It has recently completed the preparation and printing of the new edition of "*Partnership in Progress – The Centre's Collaboration and Cooperation with the Government of Bangladesh.*"

Institutional Development

ER&ID took a lead role in coordinating the initial organisation and implementation of the Board of Trustees' decision on HIV/AIDS work at the Centre, including the re-programming of the Ford Foundation HIV grant. ER&ID has also been active in the coordination of the development of the Biennial Workplan.

NORTH AMERICA OFFICE

The North American Office's Centre Fund campaign has been a successful one. During 1996, it has achieved the following:

US Government: Following nearly a year of negotiations between the Centre and USAID, the endowment agreement was signed in April 1996. The Centre Fund

Management Committee was formed to select a fund manager for USAID's contribution of \$1 million to endowment. The committee consisted of: Dr. William Greenough, Chair; Mr. Norman D'Cruz; Mr. Robert Stoll; Mr. Robert Smith; Dr. Demissie Habte; Dr. Maureen Law; Dr. Jon Rohde; and Mr. Ken Tipping.

The \$1 million endowment gift was transferred to the Centre's account at Morgan Stanley, the investment manager chosen earlier this year by the Centre Fund Management Committee. Quarterly statements are regularly being sent to USAID for review.

The Centre Tribute Dinner

On 16 September a dinner, funded by Discovery Communications Inc. and hosted by USAID, was held in tribute to the Centre and its work. Speakers at the dinner were: Mr. Brian Atwood of USAID, Dr. Al Sommer (Dean of the Johns Hopkins School of Hygiene and Public Health), Mr. Barry Gaberman (Sr. Vice President of Ford), Mayor Kurt Schmoke of Baltimore City, and Dr. Demissie Habte. There was also a video presentation by Mrs. Hillary Rodham Clinton.

The evening was a great success and helped to increase the Centre's profile. USAID has expressed interest in hosting a similar event next year. Earlier, the Director attended USAID's *Lessons Without Borders* (LWOB) Conference in Baltimore. LWOB, which celebrates achievements in foreign assistance programmes and applies lessons learned to programmes in the US, honored the Centre for its contributions to global health.

Foundations

Following months of discussions with the **Ford Foundation**, the U.S. Office submitted a proposal for **\$1 million** for the Centre endowment in March. It was subsequently approved by the Ford Board in April. A contribution of **\$150,000** was received from **The Rockefeller Foundation** for the Centre Fund. These gifts have been transferred to the Centre's account at Morgan Stanley and are being invested in the same manner as the USAID money.

The Conrad Hilton Foundation initiated an award of \$1 million to be given to an organisation that had done the most to alleviate human suffering in the past year. Nomination letters for the 1995 Award were signed by Ms. Susan Berresford of Ford Foundation, Dr. Al Sommer of The Johns Hopkins University and Dr. Joshua Lederberg of Rockefeller University. A representative of the Hilton Foundation was to have visited the Centre in March; however, due to the political situation, this visit was cancelled. Subsequently, a new proposal was submitted for the following year.

Mr. M. Lutfullahil Majid, former Secretary and Board of Trustees member, nominated the Centre for the 1996 Hilton Foundation award.

On other fronts, contact was made with numerous foundations and individuals in an effort to identify donors to the Centre Fund:

In June, the U.S. office arranged for Dr. Habte and Brent Berwager to meet with Carolyn Makinson, head of the Mellon Foundation's Population Programmes. This was Mellon's first introduction to the Centre. The U.S. office opened a door at Carnegie Foundation. Dr. Patricia Rosenfield, head of Strengthening Human Resources in Developing Countries, indicated an interest in programmes that teach people in Africa about turning research into policy.

Corporations

With leadership gifts from USAID and the Ford Foundation, this office moved into a new phase of the campaign – corporate solicitation. The US Office has been cultivating corporations, particularly those with a major presence in Asia, for the funding of projects. Since most do not have a prior relationship with the Centre, smaller projects are being submitted initially.

Discovery Communications, Inc. has taken a keen interest in the Centre. Discovery is an international cable network based in Maryland. Discovery's involvement will be helpful in attracting other corporate donors. Discovery's involvement would not only increase the profile of the Centre but also draw other corporate donors into the campaign.

The U.S. office has discussed possible funding with Gordon Douglas, President of Merck Vaccines. The office has been in contact with Levi Strauss and Chase Manhattan regarding possible support for projects.

In addition, the following are targeted for corporate solicitation: Johnson & Johnson, AT&T, American Express Bank, American Home Products, Archer Daniels Midland, Bristol-Myers Squibb, Coca-Cola Company, PepsiCo, Colgate-Palmolive Company, Hasbro Children's Foundation, The Johnson Wax Fund, Kimberly-Clark Foundation, Rhone Poulenc Rorer, Sandoz, and Nestle.

Other Activities

The US office developed some published materials to be used to introduce the Centre to prospective donors. The pieces (a brief brochure and a more detailed spiral-bound booklet) contain eye-catching graphics that convey the breadth of the Centre's history and accomplishments as well as its global reach.

Hospital Endowment Fund Contributions 1996



Foundations, trusts and business organisations

Ali Automobiles Ltd.
American International School (Concert)
American Express Bank, Dhaka
Bengal Enterprise
Dhaka Warehouse
Hospital Women Workers Cooperative Society
Faruque Bonded Warehouse
Ganges Travel Services
ICDDR, B Employees Cooperatives
Marie Stopes
National Warehouse
Padma Oil Company
Scobie & Claire Mackinnon Trust
United Insurance Co.
Zonta International

Contributions in kind

Bangladesh Biman Airlines
British Airways
Dragon Air
Ganges Travel Services
KLM Royal Dutch Airlines
Monno Group of Industries
Nepal View Travels(BD)/ IPSS
Nitol Motors
Oman Air
Qatar Airways
Regency Travels Ltd.
Sajna Restaurant
Sheba Printers
Singapore Airlines
Thai Airways International
Thai House restaurant
Unichem Products (BD) Ltd.

Individuals

Afaq, Mr. Mohammed
Ahmed, Dr. Shameem
Ahmed, Mrs. Banu
Ahsan, Mr. Syed Shamim
Alam, Mr. Firoz
Alam, Mr. Safiqul
Alatunnessa, Mussammat
Albert, Dr. M. John
Ali, Mr. Azmat
Amako, Dr. Kazunobu
Ansari, Mr. Asem
Ansari, Mrs. Loretta
Bairagi, Dr. R.
Banatvala, Prof. J. E.
Banfield, Ms. Julie
Barkat-e-Khuda, Prof.
Barnes, Dr. Graeme
Berwager, Mr. Brent
Bryce, Ms. Valerie
Choudhury, Maj. Gen. M. R. (Retd.)
Choudhury, Mr. R. A.
Choudhury, Dr. Mominul Huq
Chunming, Prof. Chen
Coghlan, Ms. Sarah E.
Cramer, Mr. David P.
Dale, Ms. Charlene
Desmet, Dr. Martinus
Faruque, Dr.
Faruque, Mr.

Felsenstein, Mr. Albert
Fuchs, Dr. & Mrs. George
Ghuznavi, Mr.
Gore, Dr. Sheila
Habte, Prof. Demissie
Haider, Dr. Rukhsana
Hamidullah, Mr.
Haque, Mr. S.
Hassan, Mr. M. M.
Hassan, Dr.
Hoda, Mr. Kazi Kamrul
Hoque, Mr. Md. Shamsul
Huq, Mr. Ziaul
Islam, Dr. Amirul
Ishtiaque, Dr.
Jalil, Prof. Fehmida
Kabir, Mrs. Shaneara
Kabir, Mr. Elthem
Khan, Dr. Mizan
Khanam, Mrs. Muslima
Law, Dr. Maureen
Mahbub, Mr. M. A.
Majumder, Mr. S. K.
Martin, Mr. Jacques
Morimoto, Ms. Miki
Piet Family

Quiah, Mr. Donald
Rabbani, Dr. G. H.
Rahman, Mr. Mustafizur
Rahman, Dr. Ataur
Rahman, Mr. G. H.
Rahman, Mr. Tayyubur
Rohde, Dr. Jon E.
Sacher, Dr. & Mrs. David
Sack, Dr. and Mrs. R. B.
Saha, Mr. N. G.
Salam, Dr. M.A.
Scott, Mr. Mathew
Shafique, Dr.
Shafiullah, Mr. Q. M.
Shewly, Ms.
Sikder, Mr. Nurul H.
Stephen, Mr.
Texeira, Mrs. May
Tipping, Mr. K. J. J.
Tunon, Dr. Cris
Uddin, Mr. Jamal
Unicomb, Ms. Leanne
Vaughan, Prof. J. P.
Wahed, Mr.
Wright, Mr. G. A. N.
Yousuf, Dr.
Zaman, Dr. Ishtiaque A.

Other Income:

Box donations
and sales proceeds
from the Matlab book,
investment income,
interest income, the
annual fundraising dinner
and
contributions from the
patients themselves

Contributions on a revenue-earned basis from 1991-96 in US \$

	1996	1995	1994	1993	1992	1991
Revenue Contributions	12,340,032	12,114,554	10,468,238	10,170,494	9,527,010	10,348,920
Aga Khan Foundation	102,929	25,809				
AMEX Foundation via CHF		41,083				
Arab Gulf Fund	100,000	(150,000)	250,000	250,000	350,000	
Australia - AusAID	322,498	310,805	299,256	210,980	234,417	232,061
Bangladesh	662,769	445,092	187,500	113,849	26,251	26,170
Bayer AG		9,136	72,866	73,159	19,068	23,218
Belgium - BADC	443,502	391,372	341,182	279,998	324,348	409,904
Canada - CIDA	219,138	510,256	353,761	800,000	856,621	885,943
Denmark - Danida			88,658	186,671	239,095	205,896
European Union	157,245	146,860	2,564	3,301		
Ford Foundation	460,345	369,238	270,347	302,022	148,669	51,715
IDRC	30,432	59,272	90,000	88,825	64,174	70,174
Japan	680,000	702,846	683,691	367,009	454,817	434,807
Johns Hopkins University		26,546	64,503	22		
Netherlands	908,400	720,913	453,850		149,385	336,238
New England Medical Center	78,318	51,773				
Norway - NORAD	124,909	164,075	122,004	133,961	97,000	310,562
Population Council	121,468	9,691		25,331	1,419	
Rand Corporation	296,212	38,301				8,000
Rockefeller Foundation	26,222	20	29,693	39,155	15,360	
Saudi Arabia	58,382	59,198	58,000	57,696	58,636	57,275
Sri Lanka	7,928	4,003				
Sweden - SIDA	498,135	511,174	528,174	383,460	385,655	340,165
Switzerland - SDC	1,062,843	1,302,562	1,419,976	1,266,215	1,340,475	1,785,342
- Red Cross	220,364	210,453	147,821			
Thrasher Foundation	38,881					
United Kingdom - ODA	708,876	618,043	488,022	417,395	291,706	277,534
United States - USAID, etc.	4,306,390	4,283,686	3,549,801	3,518,971	3,422,666	3,004,837
UNDP				(7,300)	150,178	19,062
UNDP/WHO	350,000	350,000	350,000	350,002	307,613	337,844
UNFPA		131,269	123,753	223,713	91,243	
UNICEF	166,887	312,246	305,554	301,314	324,308	325,829
WHO	93,754	36,889	53,579	76,861	64,163	88,388
WUSC						801,673
Others	93,205	134,092	133,683	105,040	64,339	86,726
Disaster Relief		287,851		602,844	45,404	229,557
Capital Contributions	876,430	281,887	0	400,000	1,435,480	330,568
Australia - AusAID		30,887				
Bangladesh		251,000			1,135,480	
Japan	710,000					
Sasakawa Foundation				400,000	300,000	300,000
United Kingdom - ODA	166,430					
UNCDF						30,568

Contributions in 1996 from Others were received from Child Health Foundation, East West Center Inc., George Mason Foundation, Helen Keller International, International Atomic Energy Center, Lederle Praxis, Procter & Gamble (via CHF), Social Development Center, Sri Lanka, UCB Didac, University of Alabama, University of Iowa and Wander AG. During 1996 contributions in kind were received from Bangladesh, Belgium, British Executive Services Overseas, Child Health Foundation (CHF) and Ford Foundation.

Training & Education Department

Head: A. N. Alam

Training is a key component of the Centre's strategy to disseminate its research findings and to contribute to the development of health research manpower. The training purposes also aim at developing and strengthening national capabilities to manage diarrhoeal disease control programmes (DDC) and family planning services; and to improve responses emerging in disaster situations.

The Training & Education Department (TED) provides training to Bangladeshi and other nationals through health research fellowships, and a variety of short national and international training courses and workshops. The programmes are designed to enhance the potential of developing countries to promote Essential National Health Research (ENHR).

A total of 512 scientists, physicians, health administrators, health personnel and trainers from 29 countries received training at the Centre during 1996.

In 1996, ICDDR,B received support from the Government of Japan, the Swedish Agency for Research Cooperation with Developing Countries (SAREC), USAID, WHO and UNICEF Bhutan) to organise specific training programmes. In addition, the Belgian Administration for Development Cooperation (BADC) sponsored participants in different training courses arranged at the Centre.

Health Research Training

The overall focus of the training programme continued to be on health research training. The major components of the programme are:

- (a) Health Research Training Fellowships,
- (b) Research Methodology Workshop, and
- (c) National Course on Epidemiological Methods in Public Health.

In addition, ICDDR,B provided supervised training in research to Bangladeshi nationals through its ongoing research projects. A total of 61 researchers from seven countries participated in these programmes.

Health Research Training Fellowships

Two fellows, one each from India and Ethiopia, received training during this period. (The normal duration of the fellowship is two years depending on the requirements of the research project undertaken by the individual fellow.) Both fellows completed their term and have returned to their institutions. The search to recruit new fellows for 1997 is under way.

Research Methodology Workshop

A 2-week workshop was attended by 13 participants from Ethiopia, Kenya, Malaysia and Myanmar and four staff members of the Centre. The workshop enabled the participants to acquire skills to develop and implement clinical and epidemiological research proposals, and to analyze and interpret data.

Course on Epidemiological Methods in Public Health

Two 4-week courses were organised in collaboration with national institutions and NGOs, and were attended by 34 participants from various national institutions of Bangladesh. The course was designed to train the participants to plan, design, analyze and undertake epidemiological studies.

Training of Bangladeshi university students

As many as 13 M.Sc. students from the Dhaka and Jahangir Nagar universities, 1 Ph.D. student from Dhaka University and 1 M.Phil. student from the Institute of Postgraduate Medicine & Research, carried out research work in the Centre's research laboratories, under supervision, for their dissertations.

Training of Trainers (TOT)

TED organises national and international training courses to update the knowledge and skills of trainers in diarrhoeal disease prevention and case management and laboratory diagnosis of diarrhoeal diseases. The training of trainers (TOT) courses aim at creating a critical mass of manpower in these areas. The trainees use the knowledge and skills to generate appropriate training programmes in their own countries.

International course on Clinical Management of Diarrhoeal Diseases

Thirty-nine physicians, nurses, and diarrhoeal disease control programme managers from Bangladesh, Bhutan, Cambodia, Ghana, Indonesia, Iran, Maldives, Pakistan, and Sudan have attended three courses.

Laboratory Diagnosis of Common Diarrhoeal Disease Agents

A 2-week course was attended by 13 participants: 3 from Bangladesh, 2 from Maldives and 1 from Morocco. The course provided the participants with an opportunity to learn the principles of laboratory procedures for isolation and identification of pathogens responsible for diarrhoea and the preparation of culture media.

Training for Instructors

With assistance and support from USAID, a workshop was organised to improve the skills of the Centre's sci-



(Top) Dr. D. Habte enjoys the rare pleasure of having fellow Ethiopians visit the Centre in a group.

(Middle) Here for a Clinical Management course sponsored by the Belgian Administration for Development Cooperation, fellows from Vietnam and Cambodia check on the condition of a young patient suffering from diarrhoea.

(Bottom) Dr. S.M. Akramuzzaman, Sr. Medical Officer, CSD, performs a test on a child as field work for his Ph.D. project, under the London School of Hygiene and Tropical Medicine, on immune disruption caused by measles.



tists for better presentation of training and educational materials. Nine mid-level scientists attended the workshop.

Training workshop on emergency response to cholera and shigella epidemics

At the request of USAID, the Centre developed and organised a workshop for training of health care professionals of international NGOs with other agencies who respond to disaster situations.

The workshop's objective was to strengthen the capacity of the international NGOs in effectively managing cholera and *shigella* epidemics to reduce morbidity and mortality. The primary mode of the workshop was to offer the participants 'hands-on' training at the patient-care facility in Dhaka and in the makeshift treatment centres in the field. The workshop has also emphasised disaster preparedness, prevention of diarrhoea, water and sanitation hazards.

It was attended by 9 participants from 8 countries representing International Medical Corps, CARE, World Vision, Save the Children (USA), Medicines Sans Frontiers, International Rescue Committee. The participants prepared an action plan to be utilised by their organisations during disasters and epidemics. Evaluation done at the end of the course indicated that though the overall objectives were achieved, the workshop curriculum may need further modifications to achieve its objective even more fully.

Family planning training programme

During 1996, ICDDR,B organised an international workshop on "Improving Family Planning Programme Effectiveness and Quality of Care through Operations Research" based on its experiences and lessons learned at Matlab and at two extension projects.

The course objectives were a) to disseminate relevant operations research approaches and findings from the experience of the Centre in MCH-FP activities, b) to examine innovative approaches used by national NGOs working in health and development and c) to discuss effective strategies to improve programme management with emphasis on quality of care.

A total of 10 participants from Bangladesh, Ghana, Indonesia, India, Kenya, Pakistan, Senegal and Thailand have attended the workshop. The participants reported that there was a good balance between practical (field) and theoretical lectures, and that the field visits were very instructive. The overall rating of the workshop was excellent and the participants felt that such workshops can contribute significantly towards strengthening the MCH-FP programmes in developing countries.

Clinical training programme

ICDDR,B offered fellowships (training on an individual basis) that provided training in research and other aspects of diarrhoeal diseases to 61 persons. The main objective of this programme was to provide the fellows with the clinical skills in diagnosing and treating patients with diarrhoea and malnutrition and acquiring insight into research methods.

The different fellowship programmes are:

Fellowship for SAARC countries, which started in 1988 with support from the Government of Japan, offers 3-month training for fellows from countries in the South Asia Association for Regional Cooperation (SAARC).

The aim of this programme is to provide training to health professionals in different aspects of diarrhoeal diseases, laboratory diagnosis of common diarrhoeal disease agents, and in community health in order to help them strengthen their own diarrhoeal disease control programmes. Ten fellows, two each from Bangladesh, Bhutan, Maldives, Nepal and Pakistan received training during 1996.

Clinical fellowships

The programme provides intensive training in different aspects of diarrhoeal diseases to physicians from Bangladesh who have completed at least one year's training either in paediatrics or internal medicine and are interested in pursuing postgraduate studies.

Fellows are selected on a competitive basis. Training at the Centre is recognised by the University of Dhaka and the Bangladesh College of Physicians & Surgeons for postgraduate diplomas/degrees in paediatrics and medicine. A total of 8 fellows received training in 1996.

BADC fellowships

The Belgian Administration for Development Cooperation offered six fellowships to Vietnam and Cambodia for training at the Centre.

The duration of training was 3 months and their fields of training were clinical management of diarrhoeal diseases and laboratory diagnosis of common diarrhoeal diseases. Three of the fellows have completed their training and 3 are presently undergoing training.

Fellowship for nurses

The programme aims to train nurses in the management of patients with diarrhoeal diseases. The Centre offered 10 fellowships in 1996 on a competitive basis.

Other fellowships

Twenty seven health professionals from Australia, Bangladesh, Canada, Ethiopia, Germany, India, Japan, The Netherlands, Pakistan, Switzerland, UK and USA

have received training in different aspects of diarrhoeal diseases. The majority came for elective clinical attachment in the hospital or the community, and assisted the PIs with ongoing research protocols. Seven conducted research for their doctoral degrees from universities in Europe and North America.

Miscellaneous national training courses

Two national training courses were organised during 1996. These clinical courses were attended by 10 DCH students from Bangladesh Institute of Child Health, and 22 physicians from the College of General Practitioners of Bangladesh. A total of 15 laboratory personnel from the Family Planning Association of Bangladesh, Concerned Women for Family Planning and Gono Shasthya Kendra have received training in laboratory diagnosis of common diarrhoeal diseases.

Another course on Syndromic Management of RTIs was conducted at the Matlab Health & Research Centre and was attended by 10 persons from the Bangladesh Rural Advancement Committee, Marie Stopes Clinic Society, CARE-Bangladesh and the Centre.

Short-term courses

During the year, a series of one and two-day sessions were organised for 309 students and health professionals from national institutions on the management of diarrhoeal diseases.

Seminars

To provide opportunities for an exchange of information and views, 23 seminars were organised during the year in addition to 36 inter-divisional scientific forums, 7 weekly seminars and 14 clinical seminars at the Clinical Research and Service Centre. Both resident and visiting scientists presented papers on various topics.





CENTRE
FOR HEALTH AND
POPULATION RESEARCH

Director's
Bureau

Staff Development

Manager: Bejoy R. Saha

One of the mandated activities of the Centre is to undertake a systematic staff development programme. The programme has helped the Centre to sustain its ongoing research and training programme and to create a critical mass of trained health professionals to provide the human resources necessary to achieve its mission. This was done by sending staff members to national and overseas institutions and organizing courses and workshops at the Centre.

In addition to fellowship/scholarship support received from a number of agencies for training of individual staff members, ICDDR,B received direct financial support from the Swiss Development Cooperation for the programme.

Overseas Training

At the beginning of the year, 12 staff members were on training in various universities. During the year an additional 34 left to begin studies, and 28 returned. Two staff members who have enrolled for Doctoral studies as external candidates are conducting research for their dissertation for Ph.D. degree from the London School of Hygiene & Tropical Medicine, (LSH&TM), United Kingdom.

Those who have returned after earning their degrees abroad are:

Dr. Tahmeed Ahmed, Senior Medical Officer, CSD, earned a Ph.D. in Gastroenterology from Tsukuba University, Japan. He received a Monbushu (Government of Japan) scholarship for his studies; **Mrs. Manakhushi Mondal**, Sr. Staff Nurse, Clinical Research & Service Centre, CSD, gained a post-diploma in Paediatric Nursing from the College of Nursing, Christian Medical College & Hospital, Vellore, India; **Mr. Zahidul Quayyum**, Sr. Operations Researcher, MCH-FP Extension Project (Urban), HPED, gained his Master's degree in Health Policy, Planning & Financing from the London School of Hygiene & Tropical Medicine, UK; **Dr. K. A. H. M. Akram**, Epidemiologist, Epidemic Control Preparedness Programme, HPED, earned his M.Sc. in Mother & Child Health from the London School of Hygiene & Tropical Medicine, UK; and **Dr. G. H. Rabbani**, Scientist, CSD, earned a Doctorate degree in Medicine from the University of Copenhagen, Denmark.

Finally, in 1996, 69 staff members attended 47 scientific conferences outside Bangladesh. In addition, a number of staff members attended scientific conferences held in the country, to present papers on the findings of their research.

Distribution of staff by discipline and expected outcome who were on training at the end of 1996

Field of study or training	Ph.D. (n=8)	Masters (n=8)	Non-degree short training (n=2)	Total (n=18)
Public Health/Primary Health Care/Health Development	2	5	0	7
Clinical Epidemiology	0	1	0	1
Microbiology/Immunology	1	0	2	3
Nutrition/ Community Nutrition	1	1	0	2
Gastroenterology	2	0	0	2
Demography	2	0	0	2
Health Policy & Financing	0	1	0	1



Mr. Zahidul Quayyum, Sr. Operations Researcher, PHSD, (above, right) shares knowledge gained while he was working on his M.Sc. at LSHTM in the United Kingdom. Below, left, Dr. Tahmeed Ahmed, Sr. Medical Officer, CSD, who recently earned his Ph.D. in Medical Sciences from the University of Tsukuba, Japan, examines a malnourished child at the Centre's Nutrition Rehabilitation Unit in Dhaka.



In-Country Training

During the year, 14 staff were sent to several institutions within the country for training in Women's Health & Reproduction, computer programming, midwifery, English language, Cost-effectiveness and Sexual Health. One person attended a full-time course for an M.Phil. degree in Nutrition at the University of Dhaka.

Dr. Jena D. Hamadani, Senior Medical Officer, CRSC, CSD, earned her Diploma in Child Health from the University of Dhaka.

In-house Training

Within ICDDR,B, four staff attended a Research Methodology Workshop and four others attended an introductory course on Epidemiology & Biostatistics organised by the Training & Education Department. ■

Dissemination and Information Services Centre (DISC)

The Dissemination and Information Services Centre (DISC) is both a depository of 'input information' and a disseminator of the Centre's research findings and relevant 'output information.' DISC has been playing an important role in supporting the Centre's research, training, dissemination, and other activities.

In addition to maintaining a modern library with most of the basic tools and technologies for storage, retrieval and dissemination of information, DISC disseminates the Centre's research findings through publication of a quarterly journal (**Journal of Diarrhoeal Diseases Research**), two newsletters (**Glimpse** in English and **Shasthya Sanglap** in Bangla), one bilingual staff news bulletin (**ICDDR,B News**), annual reports, occasional scientific reports, special publications, and working papers (See Pages 111-115). Users of DISC facilities include the Centre's staff, health professionals and researchers of other organisations – including university teachers and students and visitors.

Under the reorganisational programme, DISC was placed in January 1996 under the administrative control of the Associate Director, ER&ID. The Library Advisory Committee and the editorial boards for the journal and newsletters have continued to operate. DISC upgraded its desktop publishing facilities by adding one personal computer.

Activities performed during 1996 were:

Library Services

As in the previous years, the library services in 1996 included an extensive collection of books, journals and other periodicals through purchase and inter-library loan, provision of computerised literature searches through MEDLINE, AIDS, AHEAD, and POPLINE in CD-ROMs, reference and referral services, current awareness services, bibliography and photocopying services.

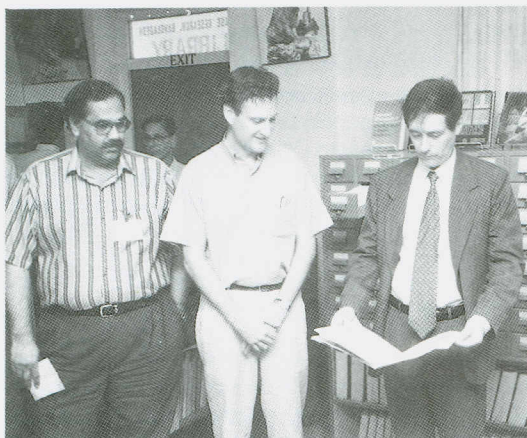
A total of 435 new books (60 purchased), 683 volumes of bound journals, and 391 current journals (244 titles on subscription) and other periodicals, and 4 databases on CD-ROM diskettes were procured during the year, thus raising the total book and journal collection to 28,524 in addition to over 12,750 reprints and documents on diarrhoeal disease-related subjects.

A total of 7,298 reader-visits took place during the year. Out of the 377 computerised literature searches conducted, 146 were for external users. DISC disseminated information on incoming learning resources through two bulletins: the Fast Bulletin, on incoming

issues of journals and periodicals, and the DISC Bulletin, on articles of relevance to the Centre's scientists, availability of new books, as well as information on conferences, training opportunities, etc. Twenty-four issues of the *DISC Bulletin* were produced in 1996.

Publication Services

DISC continued publication of the Centre's periodicals. Four issues of the quarterly *Journal of Diarrhoeal Diseases Research* that contained in each issue a bibliography on diarrhoeal diseases; four issues of the English newsletter *Glimpse*, which changed its publication frequency from bi-monthly to quarterly in the middle of the year; four issues of the quarterly Bangla newsletter *Shasthya Sanglap* which changed its publication frequency from 4 issues to 3 issues a year; six issues of the in-house bilingual *ICDDR,B News*; and the Centre's Annual Report for 1995 were published.



The Australian High Commissioner, H.E. Mr. Charles Stuart stops in at the Library with Dr. George J. Fuchs. To the extreme left is Mr. M.S.I. Khan, Head, DISC.

In addition, DISC edited and published 10 reports under Special Publication Series, and provided editorial advisory services for 24 Working Papers published by the MCH-FP extension projects (rural and urban). About 99,784 different publications were distributed or mailed during the year, and 3,734 addresses were updated. Total revenue earned in 1996 from the sale of publications, subscriptions, membership fees, editorial services, and photocopies was US\$19,030.

The library, under the inter-library loan relationship, continued to extend borrowing facilities to the National Health Library and Documentation Centre,

UNICEF, the Bangladesh Institute of Development Studies, and the Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine & Metabolic Disorders (BIRDEM). Under the national collaboration programme, 78 duplicate journal issues and books were offered to health libraries in the country.

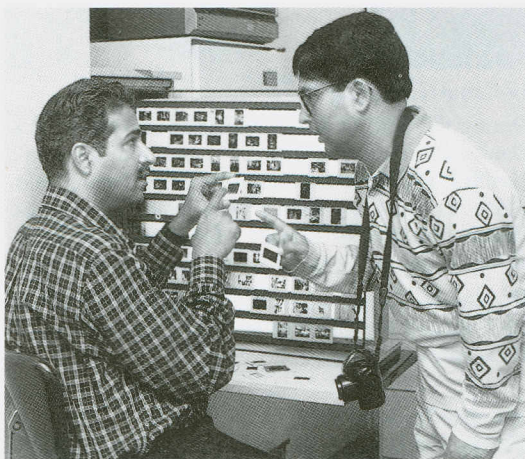
One student of the Institute of Library and Information Science (The Library Association of Bangladesh) and two students of the Department of Library and Information Science, University of Dhaka, received 3 months' training in information management at the Centre's library. In addition, six undergraduate students of the latter institution attended a 15-day internship programme at the library. At the end of the year, one assistant librarian of the Institute of Epidemiology, Disease Control and Research, Dhaka, also received month-long training.

Audio Visual Unit

Head: Asem Ansari

The Unit continued to provide support to scientists and others preparing illustrations and lay-out for publications, posters, brochures and other display materials; taking and developing photographs and slides; and audio and video recording.

1996 was a busy year due to the large number of conferences requiring posters, slides and other presentation materials. The Unit continued to provide support to the Hospital Endowment Fund campaign. ■



Above, Asem Ansari, Head, AV Unit, confers with his assistant, Fakrul, as they try to select their best slides for an upcoming issue of "Glimpse."

The Staff Welfare Association

President: Kh. A. Al-Mahmud

The Staff Welfare Association (SWA) plays a vital role in maintaining a good working relationship between administration and employees and is the means of conveying suggestions and requests from Centre staff to management.

A number of social and cultural events are sponsored by SWA. Membership is open to all Bangladeshi staff.

The association serves two constituencies – one at Dhaka and the other at the Matlab Health & Research Centre (MH&RC).

There is a single President for the two bodies, but each has its own Executive Committee, which serves for two years. The Executive Committee of the ICDDR,B SWA for the term 1996-97 took the oath from the Patron-in-Chief on January 15 & 16 at Dhaka and Matlab respectively. The Office Bearers are:

SWA Office Bearers 1996-97

Vice-President

General Secretary

Joint Secretary

Treasurer

Athletic Secretary

Social & Entertainment Secretary

Literary & Cultural Secretary

Members of the Executive Committee:

DHAKA

Shah Mustafa Kamal, Abdul Mannan I, M. Delowar Hossain, Kabir Ahmed Bhuiyan, M. Osman Ali, Abdul Khaleque, M. Shafiqul Islam, Abdus Sobhan, II

MATLAB

Md. Aftekharuzzaman, Nasir Ahmed, Fatema Akter, Shaikh Abdul Jabbar, M. Mozibur Rahman, and Sultana Razia.

President

Kh. Abdullah Al-Mahmud

DHAKA

Md. Nazrul Islam
M. Abul Hossain
M. Nurul Hoque Sikder
Harun-ur-Rashid
M. Delowar Hossain
Mohd. Abdullah
Nazmul Ahsan

MATLAB

Md. Mokbul Hossain
Ruhul Amin
Khalilur Rahman
M. Siddiqur Rahman
Sadu Miah Mirdha
Abdul Malek Patwary
Md. Ismail

The SWA Executive Committee arranged a "Barshik Bhoj" (annual feast) within the Centre's premises on July 6, 1996, which was enjoyed by all.

SWA organised various indoor games for recreational purposes of the employees and distributed prizes to the winners who competed in the indoor games competitions. SWA also considered 8 (eight) stipends at different educational levels for meritorious student-dependents of the Centre's staff members. SWA supported the Creche during the year by paying the salary of two female attendants.

In January 1996 the Executive Committee met the Director and the Patron-in-Chief to negotiate a salary raise for GS & NO level staff members of the Centre.

The Committee was given patient hearings and was informed that a recent need for budget tightening precluded any significant raise. Subsequently, the Director announced a salary raise of 2 percent, effective January 1, 1996.

On December 29 and 30, 1996, SWA arranged the second annual general meetings at Dhaka and at Matlab. In these meetings SWA again briefed the employees of the Centre about the outcome of the SWA Executive Committee's meetings earlier in November with the management and the Board of Trustees.

The meetings ended with hopes and expectations of a Happy New Year in 1997. ■

Committees

Coordination Manager: Z.B.M. Bakht

The ICDDR,B Board of Trustees provides general direction to the activities and interests of the Centre. The Board has 17 members: the Director of the Centre, three persons nominated by the Government of Bangladesh, one by the World Health Organization (WHO), one by the United Nations Children's Fund (UNICEF), and 11 members at large, of whom at least half must come from developing countries. Each June, one-third of the members complete their three-year term unless re-elected for another, after which they must retire.

The Board meets twice a year in Dhaka, in June and November, and considers matters of science, finance, and management. Highlights of the meetings are reported in the Centre's newsletter, *Glimpse*. The Director of the Centre is Secretary to the Board. The 1996 members of the Centre's Board of Trustees are listed on the right.

Program Coordination Committee (PCC)

PCC is a Committee established by the Board with the prime objective of coordinating Centre's research activities with national health institutions, and developing mechanisms to strengthen research capabilities through collaborative research undertaking.

PCC is composed of 53 members: five from the Centre, three nominated by the Board of Trustees, three nominated by the Ministry of Health and Family Welfare, and the remaining from the Government health departments or institutions, universities and non-governmental organisations related to health, nutrition, education, population studies and development.

The current Chair is Prof. M.A. Matin, the Vice Chair is Prof. Kamaluddin Ahmad, and the Member-Secretary is Dr. Demissie Habte.

The 1996 members were:

From the Centre:

The Director and Division Directors of CSD, CHD, LSD, and HPED.

From the Board of Trustees:

Three members.

From the Government of Bangladesh:

Directors General of the Health Services; Family Planning; and the National Institute of Population Research and Training (NIPORT); the Joint Secretary (Health), Ministry of Health and Family Welfare; Directors of the Institute of Epidemiology Disease

The Board of Trustees 1996

Dr. Maureen Law (Canada),
Chairperson

Dr. Demissie Habte (Ethiopia),
Secretary

Members

Prof. Peter F. McDonald (Australia)

Mr. Muhammad Ali (Bangladesh)
from April

Mr. Syed Ahmed (Bangladesh)
until March

Mr. Md. Lutfullahil Majid (Bangladesh)
until October

Maj. Gen. (Retd) M.R. Choudhury
(Bangladesh)

Dr. A.K.M. Masihur Rahman (Bangladesh)
from November

Prof. Cesar Victora (Brazil)

Prof. Chen Chunming (China)

Prof. P. Helena Makela (Finland)

Dr. Yoshifumi Takeda (Japan)

Prof. Fehmida Jalil (Pakistan)

Dr. Tawfik A.M. Khoja (Saudi Arabia)

Prof. Marian Jacobs (South Africa)
from July

Mr. Jacques O. Martin (Switzerland)

Prof. F. S. Mhalu (Tanzania)
until June

Prof. Rita R. Colwell (USA)

Dr. Jon E. Rohde (UNICEF, New Delhi)
&

Dr. R.H. Henderson (WHO, Geneva)



Minister for Health and Family Welfare, Mr. Salah Uddin Yusuf (above) and Dr. Masihur Rahman, Member, BOT, (below) address the donors' group.



Prof. Fred S. Mhalu of Tanzania, Member, BOT, delivers a talk during the Trustees' Seminar.

Control and Research (IEDCR); the Institute of Postgraduate Medicine & Research (IPGM&R); the Institute of Public Health (IPH); the National Institute of Preventive and Social Medicine (NIPSOM), the Institute of Public Health Nutrition (IPHN), the Management Information System (MIS) Unit of the Directorate of Family Planning, and of the Cancer Hospital and Research Institute; and the Project Director, CDD Programme.

From academic institutions:

Vice Chancellors of the Bangladesh Agricultural University, the Bangladesh University of Engineering and Technology (BUET), Chittagong University, Dhaka University, Islamic University, Jahangirnagar University, Khulna University, Rajshahi University and the Shahjalal University of Science and Technology.

and from other organisations:

Chairman of the Bangladesh Agricultural Research Council (BARC), and of the Bangladesh Council of Scientific and Industrial Research (BCSIR) Laboratories;

Research Director, the Bangladesh Institute of Development Studies (BIDS);

Medical Director, the Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine & Metabolic Disorders (BIRDEM);

Directors of the Institute of Nutrition & Food Science (INFS), University of Dhaka; the Bangladesh Institute of Research for Promotion of Essential and Reproductive Health & Technologies (BIRPERHT), the Institute of Bangladesh Studies (IBS), Rajshahi University; the Underprivileged Children's Education Programme (UCEP); and of the Bangladesh Medical Research Council (BMRC);

Programme Director, the Bangladesh Rural Advancement Committee (BRAC);

Professor of Paediatrics, Dhaka Shishu Hospital; and Prof. S.M. Nurul Alam, Department of Anthropology, Jahangir Nagar University.

Individuals:

Profs. M.A.Matin, Kamaluddin Ahmad, Nurul Islam, and T.A. Choudhury; Maj.Gen. M.R. Choudhury, Dr. Humayun K.M.A. Hye, Dr. Zafrullah Chowdhury, Brig. M. Hedayetullah, Dr. A.K. Khan, Dr. Mobarak Hossain and Dr. Sultana Khanum.

In June 1996, the Board of Trustees met with the Standing Committee of PCC in a joint meeting and discussed various issues involved in the development of research manpower, and strengthening the research

capabilities of health research institutions. A report on the collaborative activities on training and research, between the Centre and the national institutions, presented by the Member-Secretary was also reviewed and discussed.

The following PCC-collaborative protocols were supported by the Centre in 1996 at a total cost of US\$11,220.00:

□ **Purification and characterisation of anti-shigella-active principles from herbs (*E. hirta*).**

PI: Dr. Kamaluddin Ahmad, Director, Bangladesh Institute of Herbal Medicine, Dhaka (completed).

□ **Impact of zinc and vitamin A supplementation in malnourished children with persistent diarrhoea.**

PI: Dr. Farida Khatun, Associate Professor, Dhaka Medical College, Dhaka (ongoing).

□ **Interrelationship between anthropometric indices, vitamin A and iron status in adolescent girls.**

PI: Dr. Faruk Ahmed, Associate Professor, Institute of Nutrition & Food Science, Dhaka University.

The Centre's scientists provided technical assistance and guidance to the scientific staff of national institutions in developing research proposals, undertaking research in their institutions and writing of scientific papers. Investigators from those institutions also participated in the ongoing research protocols at the Centre.

The Research Review Committee(RRC)

RRC reviews all scientific research proposals of the Centre, originating from its four scientific divisions, evaluates their scientific merit, competence of the PIs, and relevance to Centre's objectives & priorities. This Committee is composed of clinicians, epidemiologists, social scientists, laboratory scientists and demographers from both within and outside the Centre. During 1996, the RRC met 10 times and considered 25 protocols. The members of the RRC in 1996 were:

Dr. Demissie Habte, Chairman;
Prof. Kamaluddin Ahmad (external);
Dr. M.J. Albert;
Dr. P. K. Bardhan (up to September);
Dr. Abdullah H. Baqui;
Prof. T.A. Choudhury (external);
Dr. George Fuchs;
Prof. Md. Nazrul Islam (external);
Dr. James L. Ross (up to October); and
Prof. Patrick Vaughan

The Ethical Review Committee(ERC)

ERC is a mandatory Committee of the Centre which meets regularly to examine and consider the ethical issues of research protocols involving human subjects. Its 5-member subcommittee undertakes periodic inspection and audit of research projects on behalf of the Committee and ensures that studies are being conducted ethically and according to the approved proposal.

The Committee is composed of 15 members: four from the Centre, one each from PCC, Bangladesh Medical Research Council(BMRC) and WHO in Bangladesh. The remaining eight represent individuals from varying disciplines. In 1996, ERC met nine times and considered 18 protocols. The members of ERC in 1996 were: (*external, **ICDDR,B)

Dr. K.M.A. Aziz, Anthropology,**
Dr. Halida Hanum Akhter, Population Science*
Ms. Nafiza Anwar, Nursing**
Prof. S.A.R. Chowdhury, Pharmacology*
Prof. A.B.M. Habibur Rahman Choudhury, Religion*
Brig. Q.M.S. Hafiz, WHO, Dhaka*
Prof. Farida Huq, Microbiology*
Dr. Mahmuda Islam, Social Science*
Prof. Khursheed Jahan, Nutrition*
Prof. Barkat-e-Khuda, Population Science**
Prof. M.A. Majid, General Surgery*
Dr. Sayeda Rowshan Qadir, Women's Affairs*
Dr. Shafiqur Rahman, Community Medicine*
Dr. Rafiqur Rahman, Legal practice*
Dr. M.A. Salam, Clinical Science**

The Animal Experimentation Ethics Committee (AEEC)

AEEC was established by the Board of Trustees to ensure compliance of the standard procedures for protection of research animals at the Centre. This Committee reviews protocols involving research with animals, and gives clearance to those protocols.

AEEC met once in 1996 and cleared two studies. The members of AEEC during the year were:
(*external, **ICDDR,B)

Dr. M.A. Jalil, Veterinary & Animal Husbandry*
Chairman
Prof. A.N.M. Abdul Qadir, Parasitologist*
Prof. Abu Tweb Abu Ahmed, Zoologist*
Dr. Md. Afzal Hossain Miah, Virologist*
Dr. Mohammad Hossain, Veterinary Science*
Dr. Kh. A. Al-Mahmud, Veterinarian**
and Dr. Firdausi Qadri, Immunology**



INTER-DIVISION SCIENTIFIC FORUM LIST

Clinical Sciences Division

Wasif Ali Khan. Azithromycin in the treatment of shigellosis in adults.

M.A. Khaled. Towards understanding human health: development of methodologies.

Telahun Teka. Risk factors for deaths in hospitalized children with diarrhoea.

Iqbal Kabir. Dietary supplementation of malnourished children recovering from shigellosis: effect on body composition, linear growth and morbidity during 6-month follow-up.

A. Ries, Centers for Disease Control, Atlanta; WHO Office, Harare, Zimbabwe; **M. Rollins,** University of Natal, Durban, South Africa; **M. Wellington,** Health Department, Harare, Zimbabwe; and **M.A. Salam,** ICDDR,B, Bangladesh. Death and morbidity from epidemic dysentery – perspectives from Africa and Asia.

Hasan Ashraf. Assessment of artificial fat malabsorption by the 13C-hiolein breath test in healthy volunteers.

Tahmeed Ahmed. Food allergy in children: food antigens, food-specific antibodies and their clinical relevance.

Md. Rafiqul Islam. Therapeutic efficacy of 5-aminosalicylic acid in acute shigellosis.

S.K. Roy. Efficacy of antibiotics in paediatric cholera.

P.K. Bardhan. *Helicobacter pylori* and persistent diarrhoea in children: Is there an association?

Health & Population Extension Division

Sangeeta Mookherji and Shams El Arifeen. The role of pharmacies in providing health services to the urban population.

Shafiul Azam Ahmed. Home management and ingestion of water: A rural case study.

Mizanur Rahman. A rapid assessment procedure to assess the accessibility to and utilization of family planning and maternal and child health services.

A.K. Siddique. Health care response of rural families during cholera epidemics in Bangladesh.

Cristobal Tunon. Planning urban health services and improving coordination among service providers: Preliminary findings.

Tariq Azim & Sangeeta Mookherjee. Preliminary findings from the Clinic Information System intervention.

Shameem Ahmed. Abortion in Bangladesh: evidence from two rural areas.

Bilqis A. Hoque. Effects of a water and sanitation project by DPHE and UNICEF.

Subrata Routh. Alternative MCH-FP service delivery strategies in the urban areas: Preliminary findings.

A.K. Siddique. Sentinel surveillance for monitoring cholera epidemics in Bangladesh.

Public Health Sciences Division

Nigar S. Shahid. Studies towards the development of appropriate ARI vaccine strategies for Bangladesh.

Abbas Bhuiya. Health knowledge and behaviour in five unions of Chakaria: Results from a baseline survey.

Amy Rice. Preliminary results from the RETIBETA study: babies, breastmilk and vitamin A.

Victor Gomes. Reproductive health in rural Bangladesh: Perspectives of women and health providers.

Maarten Desmet. Differentials in direct and indirect health care expenditure.

Kh. Zahid. Epidemiology of Diarrhoea and ARI in a cohort of newborn in rural Bangladesh.

K. Zaman. Malnutrition, cell-mediated immune deficiency and acute upper respiratory infections in rural Bangladeshi children.

Samuel Erny. Wheezing disorders and viral infections in young Bangladeshi children hospitalised with chest problems.

Laboratory Sciences Division

Md. Sirajul Islam. Study of association between a blue-green alga, *Anabaena* sp. and *Vibrio cholerae* O1 in microcosms by culture, FA, PCR and immunoelectron microscopy.

Shah M. Faruque. Characterization of epidemic strains of toxigenic *Vibrio cholerae*.

Rubhana Raqib. Involvement of cytokines in the pathogenesis of shigellosis.

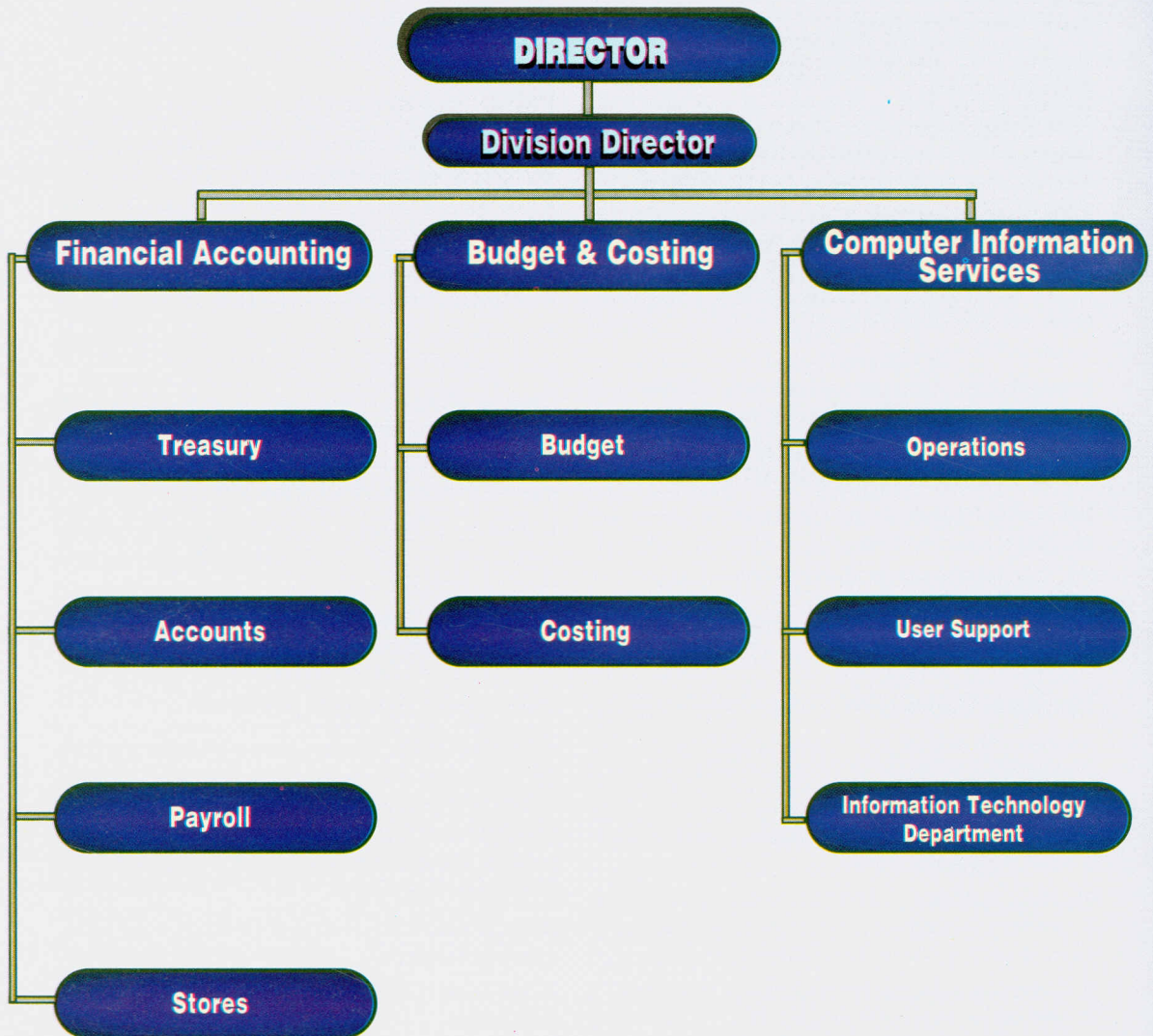
Dilara Islam. Cellular and humoral immune responses in shigellosis.

Mahbubur Rahman. Multi-resistant infections: A problem in Bangladesh.

Rashidul Haque. *Entamoeba histolytica* and *e. dispar* infection in children in Bangladesh.

Prof. Dorothy Crawford, London School of Hygiene and Tropical Medicine. An overview of virus-associated tumours in AIDS patients.

Finance Division



Finance Division

Division Director
Kenneth J.J. Tipping

The Finance Division has overall responsibility for the financial operations, computer information services, central stores and fixed asset management of the Centre and has a staff complement of 44 persons. The financial operations include custodianship of all funds and property, preparation of the annual budget and the recording of financial transactions and commitments in such a manner that accurate and timely financial reports (monthly, Board of Trustees, annual and donor) can be prepared in a manner which complies with the Centre, statutory and donor requirements and regulations.

Computer Information Services has the responsibility for the provision of main frame computer services through an IBM4361, provision of Email facilities, personal computer laboratory services, personal computer repair and maintenance and information technology development.



The Secretary (ERD), Dr. A.K.M. Masihur Rahman, Ministry of Finance, and member of the Board of Trustees, is seen signing the 1996 annual financial statements together with the Director, Division Director, Finance, and the Auditors.

Division Highlights

1996 saw the enhancement and expansion of Email facilities and part implementation of the new information technology strategy using both a UNIX and IBM platform and a backbone network. Phase one is expected to be completed by the end of December 1997, at which stage the IBM 4361 will be decommissioned. The estimated cost, including project management and training, of the new information system is approximately \$1,000,000 of which ODA of the United Kingdom have agreed to contribute \$470,000. Other donors are being actively pursued to fund the balance of this essential project.

In 1996 ICDDR,B was affected by a reduction of \$913,820 in contributions to its central activities and even though contributions to projects increased the overhead from projects was insufficient to offset this reduction.

- ☐ Contributions from donors after deducting contributions for fixed asset expenditure of US\$459,295 (1995 US\$489,954) increased by 2.2% from US\$11,624,600 to US\$11,880,737.
- ☐ ICDDR,B Hospital Endowment Fund contributed US\$326,207 (1995 US\$Nil) to help defray the costs of running the two hospitals.
- ☐ Net expenditure after deducting miscellaneous receipts of US\$906,955 (1995 US\$789,862), but excluding depreciation, increased by 6.1% from US\$11,816,887 to US\$12,536,807.
- ☐ The operating cash deficit was US\$329,863 (1995 US\$192,287) which, after charging depreciation of US\$902,953 (1995 US\$840,692), resulted in a net deficit for the year of US\$1,232,816 (1995 US\$1,032,979).
- ☐ Net current assets increased by US\$2,380,583 due to an increase of US\$3,853,925 in net other current assets partially offset by a decrease of US\$1,473,342 in cash and deposits. The increase in net other current assets included the cost of the Centre Endowment Fund Investments of US\$2,150,000 (1995 US\$Nil).

Despite continuing hiring austerity and strict control over expenditure the Centre was unable to generate an operating cash surplus for the year. Additionally unfunded depreciation has increased to US\$8,651,307 (1995 US\$7,787,536).

International Centre for Diarrhoeal Disease Research, Bangladesh

Statement of Financial Position (US\$ 000) - Abridged

	<u>1996</u>	<u>1995</u>
Assets	13,290	12,473
Cash and deposits	3,717	5,190
Accounts receivable	2,690	2,355
Centre Endowment Fund Investments	2,150	-
Inventories	479	480
Property, plant and equipment	4,254	4,448
Total liabilities and fund balances	13,290	12,473
Liabilities	4,789	6,159
Accounts payable and other	4,789	6,159
Fund balances	8,501	6,314
Fixed assets	4,254	4,448
Fixed asset acquisition and replacement	893	267
Centre Endowment Fund	2,150	-
Reserve	2,148	2,215
Operating	(944)	(616)

Statement of Activities (US\$ 000) - Abridged

Income	13,114	12,415
Donors' contributions	12,340	12,115
Other items - net	774	300
Expenditure	14,347	13,448
Personnel	8,771	8,280
Depreciation	903	841
Other items	4,673	4,327
Operating deficit	1,233	1,033

Statement of Cash Flows (US\$ 000) - Abridged

Cash flows from operating activities	(2,033)	(169)
Cash flows from investment activities	560	170
Net Increase/(Decrease) in cash and equivalents	(1,473)	339
Cash and equivalents beginning of the year	5,190	5,529
Cash and equivalents end of the year	3,717	5,190

AUDITORS REPORT

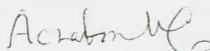
TO THE BOARD OF TRUSTEES OF THE
INTERNATIONAL CENTRE FOR DIARRHOEAL DISEASE RESEARCH, BANGLADESH

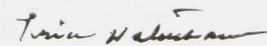
We have audited the financial statements of the INTERNATIONAL CENTRE FOR DIARRHOEAL DISEASE RESEARCH, BANGLADESH (ICDDR,B) for the year ended December 31, 1996, from which the abridged financial statements were derived. In our report of same date we expressed an opinion that the financial statements from which the abridged financial statements were derived, present fairly, in all material respects, except that "ICDDR,B Employees Separation Payment Fund" balance as at December 31, 1996 for US\$11,470,295 and corresponding investments with General Worldwide Insurance Company Limited of Guernsey, Channel Islands, has not been recognised in these accounts.

In our opinion, the accompanying abridged financial statements, except for the above, are consistent, in all material respects, with the financial statements from which they were derived and on which we expressed a qualified report.

For a better understanding of the Centre's financial position and the results of its operations for the year and of the scope of our audit, the abridged financial statements should be read in conjunction with the financial statements from which the abridged financial statements were derived and our report thereon.

Dhaka, March 17, 1997


ACNABIN & Co
Chartered Accountants


Price Waterhouse
Chartered Accountants

Donors' Contributions (US\$ 000)

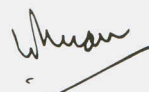
	1996	1995
Revenue Contributions	12,340	12,115
Aga Khan Foundation	103	26
American Express Foundation via CHF	-	41
Arab Gulf Fund	100	(150)
Australia AusAID	322	311
Bangladesh	663	445
Belgium - BADC	444	391
Canada - CIDA	219	510
European Union	157	147
Ford Foundation	460	369
IDRC	30	59
Japan	680	703
Netherlands	908	721
New England Medical Center	78	52
Norway - NORAD	125	164
Population Council	121	10
Rand Corporation	296	38
Rockefeller Foundation	26	-
Saudi Arabia	58	59
Sri Lanka	8	4
Sweden - SIDA	498	511
Switzerland - SDC	1,063	1,302
- Red Cross	220	210
Thrasher Foundation	39	39
United Kingdom - ODA	709	618
United States - USAID, etc.	4,306	4,284
UNDP/WHO	350	350
UNFPA	-	131
UNICEF	167	312
WHO	94	37
Disaster relief	-	288
Others	96	172
Capital Contributions	876	282
Australia - AusAID		31
Bangladesh	-	251
Japan	710	-
United Kingdom - ODA	166	-

Contributions in 1995 from Others were received from Bangladesh-DGHS, Child Health Foundation, East West Center, Inc., George Mason Foundation, Helen Keller International, International Atomic Energy Centre, Ledele Praxis, Procter & Gamble (via CHF), Social Development Center, UCB Sidac, University of Alabama, University of Iowa and Wander AG.

1996 contributions in kind, for specific and general activities, were received from Bangladesh, Belgium, British Executive Service Overseas, Child Health Foundation (CHF) and The Ford Foundation.

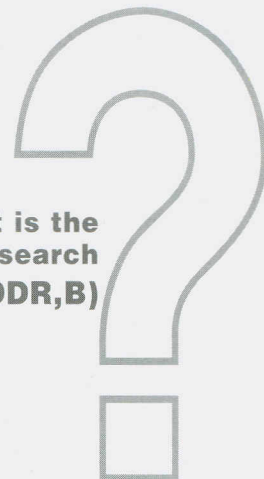


Director
ICDDR,B



Member
Board of Trustees

What is the Centre for Health and Population Research (ICDDR,B)



ICDDR,B, or "The Centre," was established in 1978 as the successor to the Cholera Research Laboratory, which was created in 1960 to study the epidemiology, treatment and prevention of cholera.

The Centre is an independent, international, non-profit organization for research, education, training, and clinical service.

Located in Dhaka, the capital of Bangladesh, the Centre is the only truly international health research institution based in a developing country. The results of research developed over the years at the Centre today provide guidelines for policy-makers, implementing agencies, and health professionals in Bangladesh and around the globe. During the past three decades, researchers at the Centre have made major scientific achievements in diarrhoeal disease control, maternal and child health, nutrition, and population sciences. These significant contributions have been recognized worldwide.

How is the Centre Organized?

The Centre is governed by a distinguished multinational Board of Trustees comprising researchers, educators, public health administrators, and representatives of the Government of Bangladesh. The Board appoints a Director and Division Directors who head the four scientific divisions and the support divisions of Finance, and Administration and Personnel.

The Clinical Sciences Division provides health services at the ICDDR,B Clinical Research and Service Centre in Dhaka, undertakes clinical and nutrition research, and trains Bangladeshi physicians and other health professionals in the clinical management of diseases and in research methodology.

The Laboratory Sciences Division has a research programme with branches in enteric bacteriology, molecular biology, bacterial genetics, environmental microbiology, histopathology, immunology, virology, parasitology, and biochemistry and nutrition; and a laboratory service programme with branches in bacteriology and clinical pathology, biochemistry and microbiology.

The Public Health Sciences Division, composed of public health professionals, anthropologists, sociologists, economists and nutritionists, focuses on public health intervention studies to improve health and reduce fertility. The Division is made up of the following: Matlab health services, including the Matlab hospital, reproductive and sexual health, child health, health and demographic surveillance, social and behavioural sciences and health economics programs.

The Health and Population Extension Division includes the two (urban and rural) MCH-FP Extension Projects, which undertake operations research and offer technical assistance to the Government of Bangladesh and to non-governmental organisations in implementing the Centre's research findings; the Environmental Health Programme, and the Epidemic Control Preparedness Programme.

The Training & Education Department coordinates efforts to provide a broad training programme that aims to contribute towards the development of global human resources in child survival and population programme research, planning and implementation

Computing Facilities: The Centre operates an IBM 4361 mainframe computer with eight megabytes (MB) of real memory and an on-line storage capacity of 3,000 MB. It is connected to 25 terminals. This system provides the capacity to analyze large data sets and is complemented by over 300 personal computers and a few Local Area Networks (LANs) throughout the Centre. New e-mail facilities have been established in the Centre. A new Information Technology (IT) strategy is in the process of implementation.

Dissemination and Information Services Centre: The Dissemination and Information Services Centre (DISC) provides access to the scientific literature on diarrhoeal diseases, nutrition, population studies, and health in general by means of Current Contents (Life Sciences and Clinical Medicine), MEDLINE, AIDS, and POPLINE databases, books and bound journals, some 400 current periodicals, etc. DISC publishes the quarterly Journal of Diarrhoeal Diseases Research (and bibliography on diarrhoeal diseases within the Journal), two bi-monthly newsletters, Glimpse and ICDDR,B News, a quarterly newsletter Shasthya Sanglap in Bangla, working papers, special publications, and monographs.

Staff: The Centre currently has well over 200 researchers and medical staff from more than ten countries doing research and providing expertise in many disciplines related to the Centre's areas of research. A total of 1,200 people are employed by the Centre.

What is the Centre's Plan for the Future?

In the 36 years of its existence ICDDR,B has evolved into a busy cosmopolitan research centre whose scientists have wide-ranging expertise. Future research will be directed towards finding cost-effective solutions to the health and population problems of the most disadvantaged people in the world. The Centre's Strategic Plan: "To the Year 2000" outlines work in three key areas:

Child Survival: Diarrhoeal diseases are responsible for the death of 3 million children every year. Acute and persistent diarrhoea and dysentery will remain priority areas for research on strategies for prevention, including behavioural modification in personal and domestic hygiene, provision of appropriate water supply and sanitation to the household, and the development of effective vaccines. The Centre's scientists will contribute to the improvement of the case management of diarrhoea based on better understanding of basic mechanisms, and national and international responses to epidemics. Risk factors for low birth rate and potential interventions, acute respiratory infections, nutritional deficiency states (including micro-nutrients) and immunization-preventable infectious diseases will also be examined, particularly as they interact with diarrhoea.

Population and Reproductive Health: The Centre has a long history of conducting pioneering research in the areas of population and family planning. The Centre played a key role in raising the contraceptive use rate among women of reproductive age in Bangladesh to almost 45% through technical assistance and operations research. So much so that the 1994 Cairo Conference hailed Bangladesh as a family planning success story. Matlab is now the model for MCH-FP programmes throughout the world, and the Centre is poised to make important contributions to maternal health and safe motherhood. In addition to continuing work in these three areas, the Centre has initiated community-based research into STD/RTI/HIV infections.

Application and Policy: The Centre will continue to play a major part in improving both the supply of and demand for existing health technologies, and in replicating the successful interventions piloted in its projects through health systems research. The Centre will increase its communication, dissemination and training efforts to influence international and national health policies in the areas of its expertise. ICDDR,B recognizes – and has given a high priority to – the need to transform research findings into action.

Internal Publication Series

[A 01] ICDDR,B Annual Report, 1995. April 1996. 128 p.

Scientific Reports

[A 02] Demographic Surveillance System-Matlab. V. 24. Registration of demographic events-1993. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. vii, 88 p. (ICDDR,B scientific report, 76)

[A 03] Demographic Surveillance System-Matlab. V. 25. Registration of demographic events-1994. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. viii, 94 p. (ICDDR,B scientific report, 77)

[A 04] Demographic Surveillance System-Matlab. V. 26. 1993 population census. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. v, 76 p. (ICDDR,B scientific report, 78)

Special Publications

[A 05] Alam SMN. Teaching health social science: Bangladesh case study. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 35 p. (ICDDR,B special publication, 51)

[A 06] Al-Mahmud A, Hossain HI, Ahmed SA, Hoque BA. Domestic water use, sanitation and hygiene education; training manual. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 24 p. [Bangla]. (ICDDR,B special publication, 48)

[A 07] Bhuiya A. Health knowledge and behaviour in five unions of Chakaria. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 38 p. (ICDDR,B special publication, 52)

[A 08] Eppler P, Bhuiya A, Hossain M. A process-oriented approach to the establishment of community-based village health posts. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 37 p. (ICDDR,B special publication, 54)

[A 09] Hoque BA, Ahmed SA, Hossain HI, Sultana N. Water and sanitation issues in disaster management; proceedings of a Workshop on GARNET Activities in Bangladesh. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 23 p. (ICDDR,B special publication, 53)

[A 10] Proceedings of the Donors' Support Group Meeting of the International Centre for Diarrhoeal Disease Research, Bangladesh, Dhaka, 7 November 1995. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 52p. (ICDDR,B special publication, 45)

[A 11] Programme & abstracts of the Fifth Annual Scientific Conference (ASCON V) of the International Centre for Diarrhoeal Disease Research, Bangladesh, Dhaka, 13-14 January 1996. xix, 76 p. (ICDDR,B special publication, 44)

[A 12] Rahman M, Barkat-e-Khuda, Hossain MB. An assessment of health and family planning needs in rural Chittagong, volume 1. Dhaka: MCH-FP Extension Project (Rural), International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 42 p. (ICDDR,B special publication, 49)

[A 13] Rahman M, Barkat-e-Khuda, Hossain MB. An assessment of health and family planning needs in rural Chittagong. Volume 2. Dhaka: MCH-FP Extension Project (Rural), International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 46 p. (ICDDR,B special publication, 56)

[A 14] Ross JL, Chowdhury SNM, Mirza T. Health, gender, sexuality; Bangladesh country report. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 39 p. (ICDDR,B special publication, 50)

[A 15] Ross JL. The program response of the social and behavioral sciences to the ICPD-POA; a proposed protocol 1996-2001. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 44 p. (ICDDR,B special publication, 46)

[A 16] Thwin AA, Islam MA, Baqui AH, Reinke WA, Black RE. Health and demographic profile of the urban population of Bangladesh: an analysis of selected indicators [special research report]. Dhaka: MCH-FP Extension Project (Urban), International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 82 p. (ICDDR,B special publication, 47)

Working Papers

[A 17] Ahmed S, Haque I, Barkat-e-Khuda, Hossain MB, Alam S. Abortion in rural Bangladesh: evidence from the MCH-FP Extension Project. Dhaka: MCH-FP Extension Project (Rural), International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 25 p. (ICDDR,B working paper, 63) (MCH-FP Extension Project (Rural) working paper, 121)

[A 18] Ashraf A, Dunston AG, Hasan Y, Barkat-e-Khuda, Maru R. Strengthening front-line supervision to improve performance of family planning field workers in Bangladesh. Dhaka: MCH-FP Extension Project (Rural), International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 57 p. (ICDDR,B working paper, 47) (MCH-FP Extension Project (Rural) working paper, 110)

[A 19] Barkat-e-Khuda, Hossain MB. Fertility decline in Bangladesh: an investigation of the major factors. Dhaka: MCH-FP Extension Project (Rural), International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 28 p. (ICDDR,B working paper, 48) (MCH-FP Extension Project (Rural) working paper, 111)

[A 20] Hossain MB, Phillips JF. The impact of outreach on the continuity of contraceptive use in rural Bangladesh. Dhaka: MCH-FP Extension Project (Rural), International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 26 p. (ICDDR,B working paper, 49) (MCH-FP Extension Project (Rural) working paper, 112)

[A 21] Jahan SA, Thwin AA, Tunon C, Nasreen S. Urban men and their participation in modern contraception: an exploratory study. Dhaka: MCH-FP Extension Project (Urban), International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 38 p. (ICDDR,B working paper, 68) (MCH-FP Extension Project (Urban) working paper, 23)

[A 22] Jamil K, Streatfield K, Salway S. Modes of family planning service delivery in the slums of Dhaka: effects on contraceptive use. Dhaka: MCH-FP Extension Project (Urban), International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 20 p. (ICDDR,B working paper, 46) (MCH-FP Extension Project (Urban) working paper, 16)

[A 23] Juncker T, Khanum PA, Uddin MJ, Das SC. FWA's new role in antenatal care and use of a pictorial card for creating awareness of obstetric emergencies. Dhaka: MCH-FP Extension Project (Rural), International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 45 p. (ICDDR,B working paper, 50) (MCH-FP Extension Project (Rural) working paper, 113)

[A 24] Juncker T, Khan MH, Ahmed S. Interventions in obstetric care: lessons learned from Abhoynagar. Dhaka: MCH-FP Extension Project (Rural), International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 27 p. (ICDDR,B working paper, 66) (MCH-FP Extension Project (Rural) working paper, 124)

[A 25] Khan MA, Rahman M, Khanum PA, Barkat-e-Khuda, Kane TT, Ashraf A. Awareness of sexually transmitted disease among women and service providers in rural Bangladesh. Dhaka: MCH-FP Extension Project (Rural), International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 22 p. (ICDDR,B working paper, 65) (MCH-FP Extension Project (Rural) working paper, 123)

[A 26] Khan MMA, Rahman M. Determinants of contraceptive method-choice in rural Bangladesh. Dhaka: MCH-FP Extension Project (Rural), International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 22 p. (ICDDR,B working paper, 54) (MCH-FP Extension Project (Rural) working paper, 117)

*Not listed in earlier annual reports

[A 27] **Khanam PA**, Wirzba H, Haque I, Mirza T, Juncker T. Service delivery at the union health and family welfare centre: the clients' perspective. Dhaka: MCH-FP Extension Project (Rural), International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 36 p. (ICDDR,B working paper, 55) (MCH-FP Extension Project (Rural) working paper, 118)

[A 28] **Mirza T**, Ashraf A, Kabir H, Wajed A, Ahmed J. Clinic waste disposal in the rural family planning programme of Bangladesh. Dhaka: MCH-FP Extension Project (Rural), International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 29 p. (ICDDR,B working paper, 56) (MCH-FP Extension Project (Rural) working paper, 119)

[A 29] **Mirza T**, Ashraf A, Kabir H, Ahmed J. Training experience in domiciliary injectable contraceptive services in the National Family Planning Programme. Dhaka: MCH-FP Extension Project (Rural), International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 26 p. (ICDDR,B working paper, 57) (MCH-FP Extension Project (Rural) working paper, 120)

[A 30] **Mookherji S**, Kane TT, Arifeen SE, Baqui AH. The role of pharmacies in providing family planning and health services to residents of Dhaka, Bangladesh. Dhaka: MCH-FP Extension Project (Urban), International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 27 p. (ICDDR,B working paper, 61) (MCH-FP Extension Project (Urban) working paper, 21)

[A 31] **Mozumder ABMKA**, Sarker AH, Barkat-e-Khuda, Rahman DMM. Gender composition of surviving children and contraceptive use in Bangladesh. Dhaka: MCH-FP Extension Project (Rural), International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 14 p. (ICDDR,B working paper, 64) (MCH-FP Extension Project (Rural) working paper, 122)

[A 32] **Perry HB, III**, Begum S, Begum A, Kane TT, Quaiyum MA, Baqui AH. Assessment of the quality of MCH-FP services provided by field workers in Zone 3 of Dhaka city and strategies for improvement. Dhaka: MCH-FP Extension Project (Urban), International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 74 p. (ICDDR,B working paper, 62) (MCH-FP Extension Project (Urban) working paper, 20)

[A 33] **Perry HB**, Arifeen SE, Hossain I, Weierbach R. The quality of urban EPI services in Bangladesh: findings from the urban initiative's needs assessment study in Zone 3 of Dhaka city. Dhaka: MCH-FP Extension Project (Urban), International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 61 p. (ICDDR,B working paper, 69) (MCH-FP Extension Project (Urban) working paper, 24)

[A 34] **Quaiyum MA**, Tunon C, Baqui AH, Quayyum Z, Khatun J. Impact of national immunization days on polio-related knowledge and practice of urban women in Bangladesh. Dhaka: MCH-FP Extension Project (Urban), International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 17 p. (ICDDR,B working paper, 60) (MCH-FP Extension Project (Urban) working paper, 19)

[A 35] **Rahman M**. Child mortality and fertility regulation behaviour in Bangladesh: implications for family planning programmes. Dhaka: MCH-FP Extension Project (Rural), International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 38 p. (ICDDR,B working paper, 52) (MCH-FP Extension Project (Rural) working paper, 115)

[A 36] **Rahman MM**, Hossain MB, Hossain A, Das SC. Prevalence and continuation of injectable contraceptives. Dhaka: MCH-FP Extension Project (Rural), International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 11 p. (ICDDR,B working paper, 53) (MCH-FP Extension Project (Rural) working paper, 116)

[A 37] **Roy NC**. Determinants of child malnutrition in rural Bangladesh. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 31 p. (ICDDR,B working paper, 51) (MCH-FP Extension Project (Rural) working paper, 114)

[A 38] **Salway S**, Nahar Q, Ishaque M. Alternative ways to feed infants: knowledge and views of men and women in the slums of Dhaka city. Dhaka: MCH-FP Extension Project (Urban), International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 64 p. (ICDDR,B working paper, 58) (MCH-FP Extension Project (Urban) working paper, 17)

[A 39] **Salway S**, Nahar Q, Ishaque M. Women, men and infant feeding in the slums of Dhaka city: exploring sources of information and influence. Dhaka: MCH-FP Extension Project (Urban), International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 43 p. (ICDDR,B working paper, 59) (MCH-FP Extension Project (Urban) working paper, 18)

[A 40] **Thwin AA**, Jahan SA. Rapid appraisal of urban health needs and priorities. Dhaka: MCH-FP Extension Project (Urban), International Centre for Diarrhoeal Disease Research, Bangladesh, 1996. 64 p. (ICDDR,B working paper, 67) (MCH-FP Extension Project (Urban) working paper, 22)

Journal and Newsletters

[A 41] **Journal of Diarrhoeal Diseases Research** (also includes: Bibliography on Diarrhoeal Diseases). v.14, nos.1-3, 1996

[A 42] **Glimpse**. v. 17, no. 6, 1995 and v. 18, nos. 1-3, 1996.

[A 43] **Shasthya Sanglap**. v. 4, no. 4, 1995 and v. 5, nos.1-3, 1996

[A 44] **DISC Bulletin**. v. 20, nos. 1-24, 1996

[A 45] **ICDDR,B News**. v. 6, nos. 5-6, 1995 and v. 7, nos. 1-4, 1996

Original Scientific Papers

(Including Short Reports)

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