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**CENTRE**  
FOR HEALTH AND  
POPULATION RESEARCH

# 1995 ANNUAL REPORT

## Acronyms & Abbreviations

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

## 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.**



**1995  
ANNUAL  
REPORT**

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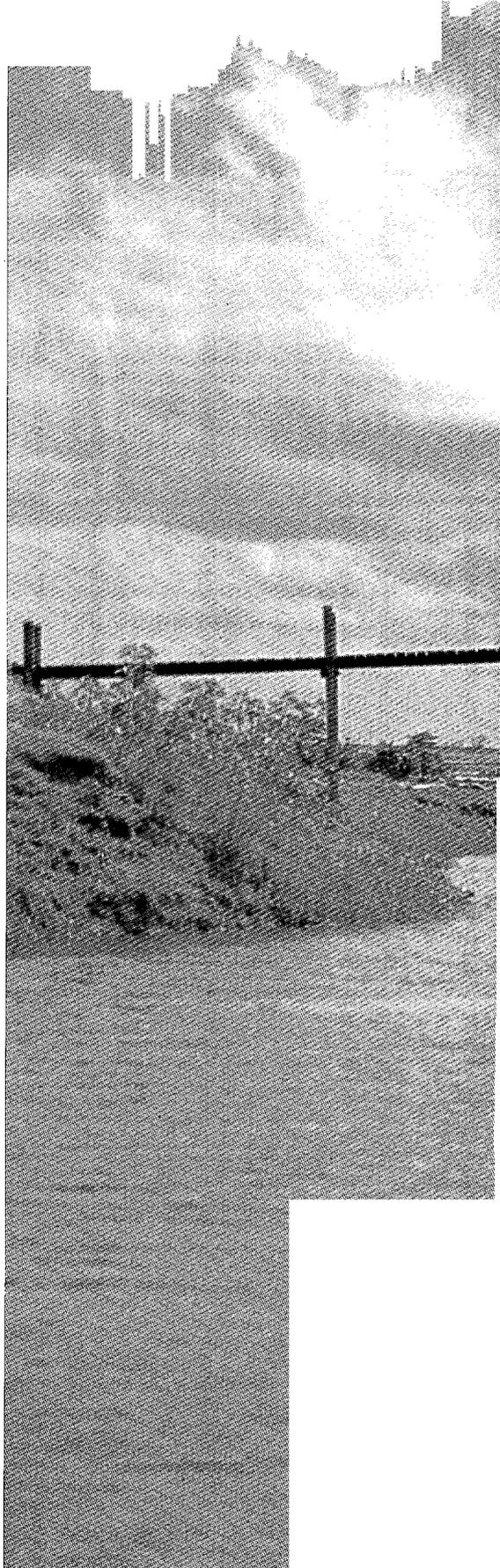
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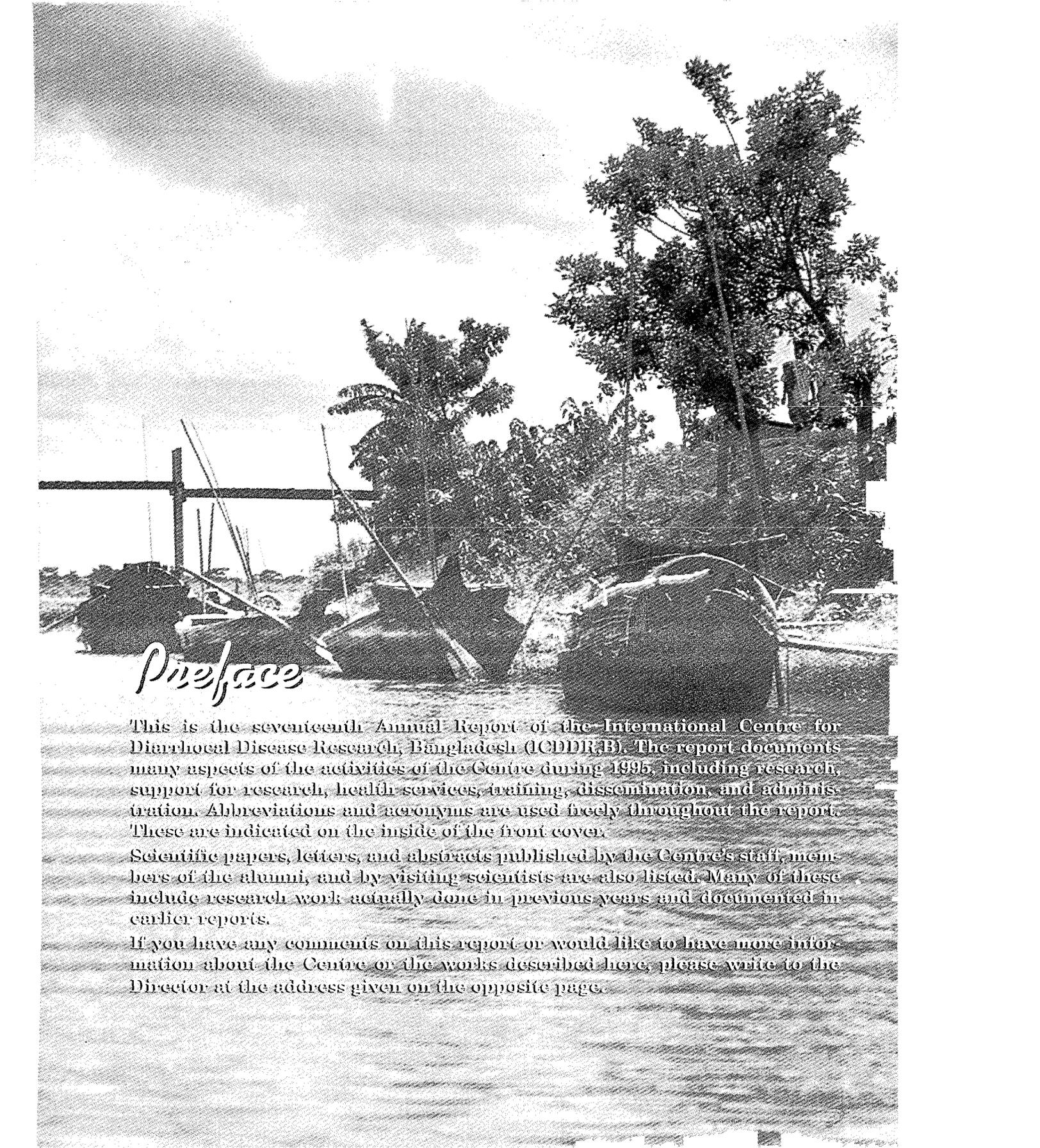
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ICDDR,B, the Centre for Health and Population Research, publishes a journal, three newsletters, scientific reports, monographs, working papers, and special publications on subjects relating to diarrhoeal diseases, and population and reproductive health.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





## *Preface*

This is the seventeenth 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 1995, 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 Director at the address given on the opposite page.

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**Clinical Sciences Division (CSD)**

14 = Clinical Research and Service Centre

15 = X-ray Unit  
Child Health Programme

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**Laboratory Sciences Division**

31 = Enteric Bacteriology Laboratory  
Immunology Laboratory

33 = Environmental Microbiology Laboratory

34 = Bacterial Genetics Laboratory  
Molecular Biology Laboratory

35 = Virology Laboratory  
Parasitology Laboratory

36 = Biochemistry and Nutrition Laboratory

38 = Department of Laboratory Services  
Clinical Microbiology Laboratory

39 = Animal Resources Branch  
Research and Treatment Section

40 = Small Animal Clinic  
Production and Nutrition Section  
Histopathology Laboratory

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Clinical Biochemistry Laboratory

41 = Managerial and Technical Support  
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**Community Health Division (CHD)**

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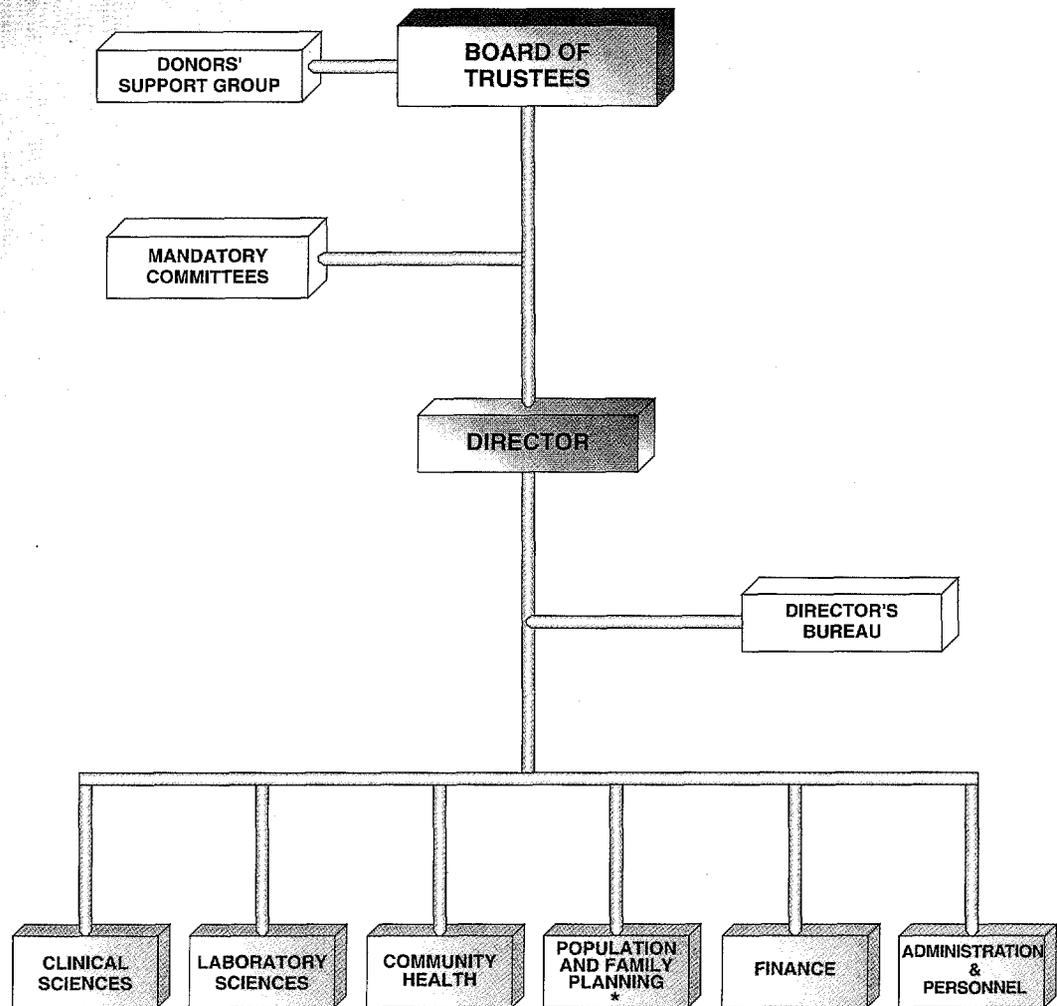
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# ICDDR,B CENTRE FOR HEALTH AND POPULATION RESEARCH



\* Since December this has been renamed the Health and Population Extension Division (HPED)

## *Director's Report*

What do the First Ladies of the USA and the Republic of Mali, and the Crown Prince of Belgium, have in common? They all have admiration for the Centre and visited it during 1995! Such visits by high profile personalities provide opportunity for broad exposure and confirm the recognition of the Centre as a valuable international resource. The visit of Mrs. Hillary Rodham Clinton, for example, enabled the Centre and its work to receive extensive publicity within the United States and beyond. The Centre felt very much honoured and greatly appreciated these visits. In the climate of shrinking global resources for development assistance and particularly for health research, these events provide fresh hope.

The year also witnessed a large turnover of senior management staff with all but one scientific division director being replaced, and several new international-level staff recruited. For the first time in many years the Centre succeeded in filling five of the six posts for division directors.

With the scientific research team strengthened, in late 1995 the Centre started addressing the need to adjust its organizational structure in line with the goals and objectives set in the Strategic Plan – To the Year 2000. The first step was the creation of an extension division – Health and Population Extension Division – consisting of the various programmes and projects involved in action research. This was in response to growing national and international pressure to put more emphasis on the translation of research into policy and action.

The role of Matlab is being reassessed to position it better to address current health research priorities, and to make it more cost-effective. All of the activities in Matlab, including the MCH-FP programme, Demographic Surveillance System (DSS) and other research projects have now been placed under the Community Health Division. The demographic surveillance system and the allied health information systems will be integrated – to better support research activities.

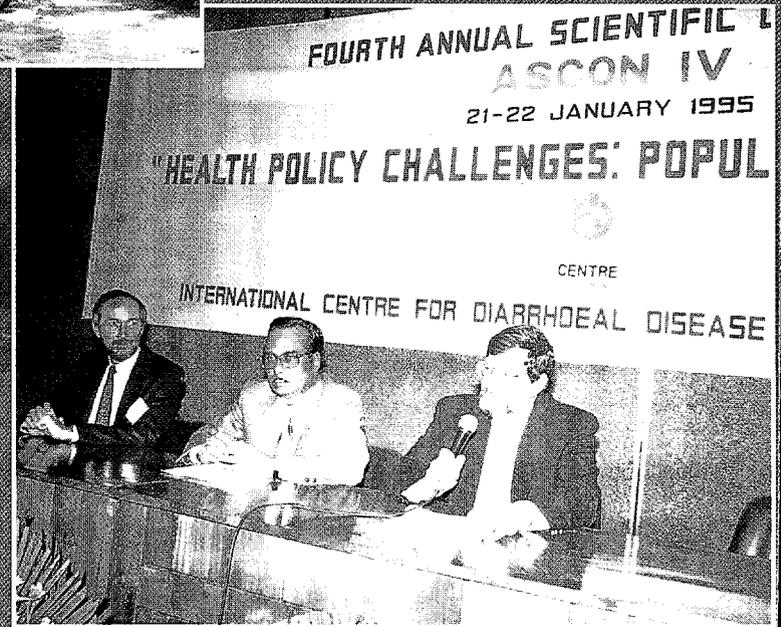
Research has continued to be the predominant pre-occupation of the Centre. This Annual Report describes the many activities undertaken at the Centre.

The right balance between strategic research (generation of knowledge to understand health and health system problems) and applied research (including product development) on the one hand, and between the primary priority areas — child survival and reproductive health — have, hopefully, been maintained.

Perhaps the most notable effort has been in research towards the development of a comprehensive reproductive health package carried out both in Matlab and the different sites of the MCH-FP Extension project. This included studies on the magnitude and aetiological spectrum of reproductive tract infections, including sexually transmitted infections, the development of second generation family planning service-delivery models (from doorstep to fixed facilities), and understanding the constraints to an effective delivery of emergency obstetric care. The design of these studies is such that the lag time between the availability of the findings and application in the field will be considerably shortened.



1995 was another busy year for the Centre, its staff, and its ever-increasing clientele of patients. We had important conferences, important guests. And there will be more in the year to come and the years after that....



Another challenging undertaking is an operations research project to improve a water, sanitation, and hygiene education intervention in a whole sub-district (thana). Although this is spearheaded by the Centre it has the full involvement of the community, several government ministries, and NGOs. This project will be critical to efforts to prevent diarrhoea morbidity in the long run.

A parallel strategy to prevent diarrhoea is to promote exclusive breastfeeding. After a successful pilot study in the Centre's hospital in which it was conclusively shown that it is possible to educate mothers to switch to exclusive breastfeeding of their infants in the first 4-6 months of life, the intervention moved to the community using trained peer counsellors selected from the community. This intervention is potentially one of the most effective means of reducing morbidity and mortality of infants during the first 6 months of life.

The Centre has also been occupied with research to generate new knowledge. Examples include the demonstration of astroviruses as one of the possible causes of persistent diarrhoea, the finding of an additional virulence factor (cyto-lethal distending toxin) of enteropathogenic *Escherichia coli*, the potential role of reactive oxidative species in the proclivity of malnourished children to infectious diseases, etc. The development of a novel rabbit model for shigellosis will, for the first time, facilitate detailed studies on pathogenesis and treatment of this important health problem.

The findings of a study that examined the potential of protecting infants in the first few months of life from invasive pneumococcal disease by vaccinating the mothers during pregnancy elicited a lot of international interest and attention. The Centre is pursuing these and other studies on pneumococcal disease in childhood and is likely to undertake a large-scale vaccine trial soon.

Nutrition is an important discipline for the Centre. Indeed, prior to 1986, it constituted a full division but was subsequently incorporated into the other scientific divisions. One of the reasons for such a move was that nutritional problems have multifactorial origin and should not be studied in isolation, especially because malnutrition is so inextricably causally related to infection. Nevertheless, the recent establishment of an inter-divisional working group on nutrition is a deliberate effort to highlight the important role of nutrition in the Centre's research agenda and a confirmation of continuing activity in this area.

Once again over 125,000 patients visited the Dhaka and Matlab hospitals. The normal bimodal peaks of epidemic diarrhoea due to cholera were partially eclipsed in Dhaka and its environs by a large superimposed outbreak due to enterotoxigenic *E. coli* that followed the freak premonsoon floods.

The incidence of Bengal vibrio continues to decline. However, it has certainly not disappeared and remains a significant enteropathogen in the southern part of the country. Tracking the routes of this organism and understanding how it evolved remains a fascination for our scientists.

The training endeavours during the year reflected the Centre's strengthened commitment to research capacity-building and towards the development of global human resources in child survival and management of reproductive health programmes. Fourteen courses, involving nearly 600 persons, and a fellowship programme for nearly 50 individuals were provided during this period. Participants came mainly from 20 countries in Asia, Africa and South



America. A new initiative undertaken jointly with the Office of Foreign Disaster Assistance at USAID was a course held during the year on emergency response to diarrhoeal epidemics. This was built on the experience of the Centre during the cholera epidemic in Goma, Zaire, and was specifically designed to build response capacity amongst the major international NGOs engaged in such activities. More courses are planned for 1996 and beyond.

A few years ago the Centre embarked on a resource development strategy that had as a target a 10% or more increase in the annual flow of funds by broadening its funding base. It is gratifying that this has been attained. Noteworthy for 1995 has been the very significant increase of the contribution of the Government of Bangladesh (\$1 million). Another important achievement was the establishment of a branch of the External Relations and Institutional Development in Columbia, Maryland, charged with the responsibility of building an endowment for the Centre (The Centre Fund). Considerable progress has been made to mobilize initial funds from the Ford Foundation, the Rockefeller Foundation, and USAID.

Complementary to fund-raising is the effective use of available resources. The policy of enforcing economic austerity measures and limiting the size of staff has endured. Insignificant increments of staff salaries provided further savings but cannot indefinitely remain in force without demoralizing staff and affecting productivity. A cost and management review of the hospital was undertaken as an initial measure to examine areas for cost-cutting. Allocation of targetted research grants through an internal system of competition has been instituted and is perceived as a fair and wise use of scarce funds.

Dissemination of the research findings of the Centre was pursued with increased vigour through publications and presentations at both national and international forums. Several workshops and meetings were also held with government institutions and NGOs in Bangladesh. Senior staff were involved in high-level task forces in MCH, family planning, diarrhoeal disease control, and provided advice and technical assistance. This year's Annual Scientific Conference had as its theme "Health Policy Challenges: Population and Cholera." More than 40 papers were presented. The hub of the Dissemination and Information Services Centre (DISC), the Library, is continuously updating itself both as depository of archival material and as disseminator of the most current scientific literature pertinent to the Centre's priorities and goals.

The Centre has also maintained wide-ranging national, regional and international collaborative links with academic and research institutions.

These, then, are some of the highlights of the year. The following pages tell the rest of the story....

Demissie Habte, M.D.  
DIRECTOR

14 March, 1996.

## 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**

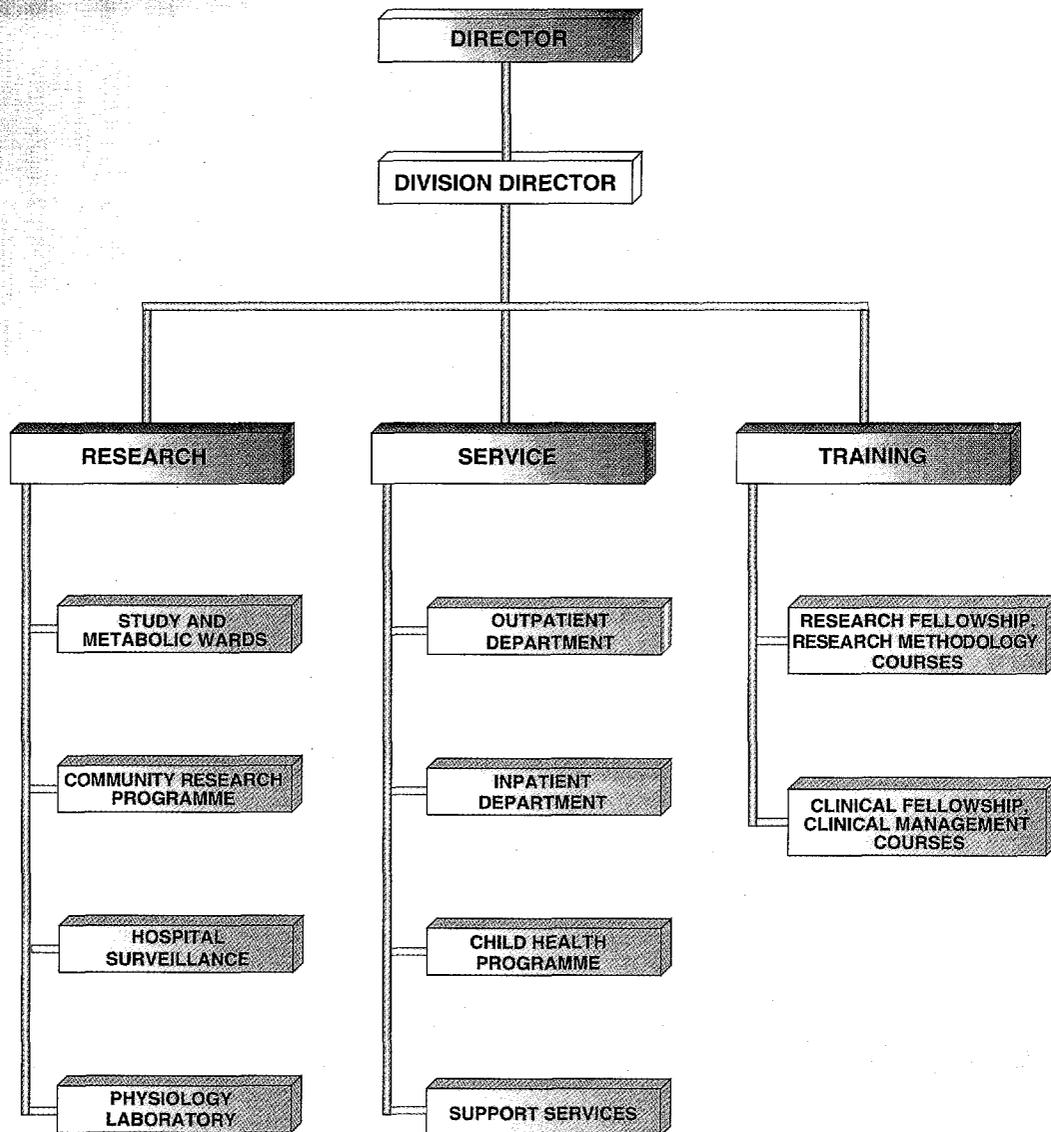
The 25th anniversary of ORS is celebrated; an ICDDR,B cholera epidemic team goes to Goma to assist Rwandan refugees, identifies pathogens, and reduces mortality from as high as 48.7% to < 1%.

**1995**

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

*(For more about the Centre, see P.121)*

# CLINICAL SCIENCES DIVISION



# CSD

## Clinical Sciences Division

**Division Director**  
**George J. Fuchs**

The major activities of the Clinical Sciences Division (CSD) fall into three general categories. These are:

- ◆ Clinical research in the field of diarrhoeal diseases and related areas of nutrition,
- ◆ Provision of care to patients with diarrhoeal diseases and associated problems, and
- ◆ Training of health professionals (international and Bangladeshi) in the management of diarrhoeal diseases and clinical research.

To meet the division objectives, the CSD operates a hospital in Dhaka, the Clinical Research & Service Centre (CRSC), popularly known as "The Cholera Hospital." A large number of patients with a spectrum of diarrhoeal and associated problems provide unique opportunities to acquire skills in managing diarrhoeal disorders and clinical research. The majority of the CSD studies are performed in the hospital, which has a 15-bed

### Division Highlights

- Short-chain fatty acids (SCFAs) were shown to reduce the inflammatory response in the colon and result in histologic and bacteriologic improvement in a rabbit model of *Shigella*-induced colitis. SCFAs inhibited colonic water and electrolyte secretion induced by cholera toxin in another study.
- A high-protein diet was found to prevent growth failure in children following shigellosis.
- Urinary loss of vitamin A was observed during shigellosis; metabolism and mechanisms were explored.
- Antimicrobial trials in cholera and shigellosis continued to result in simplified regimens and new treatment options.
- New, noninvasive methods to assess gastric acid output were validated.
- The rapid emergence and predominance of *V. cholerae* O139 over *V. cholerae* O1, beginning in 1993, was considered to possibly herald the start of the eighth pandemic of cholera. However, data from the hospital surveillance study showed that the prevalence of *V. cholerae* O139 decreased dramatically – with *V. cholerae* O1 resuming the role of the predominant cholera strain.
- An epidemic of enterotoxigenic *Escherichia coli* resulted in an extraordinarily large number of patient visits to the Dhaka hospital in 1995.

"Clinical Study Ward" and a 12-bed "Metabolic Research Ward." Studies are also conducted in the "Short Stay Ward" and the "General Ward" of the hospital, and yet other studies in selected field sites within urban/peri-urban Dhaka and at the Centre's animal resources branch.

In addition to providing care to diarrhoeal patients and the nutrition rehabilitation of severely malnourished children, CRSC provides health education through its Child Health Programme. Topics emphasized include: prevention and treatment of diarrhoeal diseases; immunization against EPI diseases; nutrition; psychosocial stimulation of children; and birth spacing.

CSD also operates a Surveillance Programme in which a 4% sub-sample of patients (every 25th patient) attending the CRSC is investigated in detail. The study of the aetiologic spectrum of diarrhoeal diseases and the monitoring of antibiotic resistance are the primary objectives of this programme.

Several new initiatives were undertaken in 1995. Among the more notable were administrative changes shown below, including the appointment of a Nursing Consultant to enhance the quality of nursing care and training of the members of the nursing staff of CRSC. Three senior paediatricians and a radiologist continued to provide consultancy for better training of the staff doctors and clinical fellows of the Division.

#### **Clinical Research & Service Centre (CRSC)**

Chief Physician: M.A. Salam

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

A total of 114,729 patients received treatment at the Clinical Research & Service Centre in 1995, which was 578 more patients than in 1994 and the second highest number of patients treated at CRSC since its establishment in 1962. The outbuilding or "pavilion" constructed in 1993 on the south side of the CRSC building remained useful in 1995 because of the constantly

## **Activities initiated in 1995**

An Advisory Council was instituted comprising senior members of the Division to establish systematic two-way communication between the Division Director and members of the scientific staff, and to ensure staff input and discussion on research, clinical and administrative issues affecting the Division. The Advisory Council meets on a weekly basis.

A bimonthly CSD meeting was initiated to present and review proposals in the process of development, discuss ongoing protocols, inform the Division members of new protocols to be implemented, and for the Division members to report new or interesting findings presented at scientific meetings and conferences which they attended.

There are currently more than 50 nurses employed by the ICDDR,B Treatment Centre who have patient care activities as their principal responsibility. A Nursing Committee was formed to review and make recommendations regarding all aspects of nursing services, including nursing administration, nursing care, and nursing staff development and continuing education.

The Research Quality Assurance Committee was established to formalize guidelines and requirements for investigators and ancillary research staff in the execution of research protocols. The committee has developed guidelines for principal investigators, a list of specific items to be included in the systematic monitoring (eligibility of study subjects, adequacy and accuracy of data collection and recording, documentation), and internal standardization of procedures, including anthropometry.

The Physiology Laboratory (PL) provides resources in laboratory and other equipment in support of clinical and animal experimentation in selected fields with direct relevance to the clinical research programme. In 1995, a body composition laboratory and a modified spectrophotometric assay for bromide to assess extracellular water were established. Other new areas of CSD/LSD collaboration using the PL include the development of Ussing chamber facilities as well as laboratory capabilities to investigate the role of reactive oxidative species and nitric oxide species in the mechanisms of intestinal inflammation and immune regulation.

increasing number of patient visits. A total of 7,232 patients required admission to one of the inpatient wards (General and Special Care Wards, and Research Wards), which was 971 (15.5%) higher than in 1994.

Of the total 7,232 inpatient admissions, 6,492 (90%) were admitted in the service wards of the CRSC for complicated illnesses, 10.6% higher than admissions in 1994. Those patients were hospitalized for a total of 36,744 days or for an average of 5.7 days/patient, 0.1 day/patient higher than in 1994.

Of the 7,232 patients admitted in the inpatient wards because of complicated illnesses, 5.9% died despite all possible efforts. The total deaths in 1995 were 12% less than in 1994, and 23% less than deaths in 1993. Deaths as a percentage of total admissions in the inpatient wards were 8.2% in 1993, 7.8% in 1994 and 5.9% in 1995.

Of the 7,232 patients admitted to the inpatient wards, *V. cholerae* O139 was isolated from faecal culture of only 0.6% patients compared to 1.12% patients in 1994 and 3.8% patients in 1993. 2.2% (one patient) infected with *V. cholerae* O139 died in 1995 compared with 2.2% patients in 1994 and 4.2% in 1993.

The total number of patients infected with *Salmonella typhi* is on the increase. Resistance to ampicillin and chloramphenicol has been observed to be decreasing, but not to trimethoprim-sulphamethoxazole. Vibrios other than *V. cholerae* O1 and O139 were isolated from 70 (0.97%) of the admitted patients compared with 1.1% patients in 1994 and 6.1% in 1993.

A total of 110,345 litres of intravenous fluids were used for treatment of patients at CRSC in 1995.

### 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 Oral Rehydration Solution (ORS) and therapeutic interventions in diarrhoeal diseases, development of therapeutic diets, among others. The Metabolic Research Ward has 12 beds for metabolic and nutrition balance studies.

Research projects conducted in this ward include those designed to improve the 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.

### X-Ray Unit

A total of 10,178 X-Ray examinations were performed at this unit in 1995, which was 34% more than that in 1994. These included 86% chest X-rays and 8% abdominal X-rays.

### Child Health Programme

Coordinator: M.A. Islam

Funded by: Core funds

Since 1988 the Child Health Programme (CHP) has been offering preventive health care to children and their mothers reporting to CRSC. In addition, the programme has been used to conduct research and training. Preventive services include health education, immunization, nutritional rehabilitation, growth monitoring, and family planning.

During 1995, 33,666 group health education sessions were conducted on home management and prevention of diarrhoea, immunization, and nutrition, covering approximately 88% of mothers reporting to CRSC.

Children aged less than two years were immunized against six vaccine-preventable diseases, and tetanus toxoid was administered to mothers of children with diarrhoea. About 80% of all children who come to CRSC have some degree of malnutrition and nearly half of those admitted to one of the inpatient wards have severe malnutrition.

Health workers of CHP give dietary counselling to the mothers of these malnourished children. Among the most severely malnourished, 241 children – together with their mothers – were kept in the in-patient Nutritional Rehabilitation Unit (NRU). The programme also conducted operations research and disseminated the findings through international journals, seminars, and workshops. Seventeen health workers from two NGOs received hands-on training. One fellow stayed for three months to receive practical training in nutrition and dietetics.

### Changing epidemiology of cholera due to *Vibrio cholerae* O1 and O139 Bengal in Dhaka, Bangladesh

PIs: A.S.G. Faruque, G.J. Fuchs and M.J. Albert

Funded by: UNDP and WHO

The trends in cholera were studied for the period from January 1992 to May 1995. *V. Cholerae* O139 Bengal emerged as the second aetiological agent of cholera in

**CSD** Dhaka in January 1993. In 1993, the majority of cholera cases were due to *V. Cholerae* 0139, with *V. Cholerae* 01 accounting for only a small proportion of cases.

During the latter part of the study period (January 1994-May 1995), *V. Cholerae* 01 re-emerged as the predominant cholera strain. The predominant age group affected in endemic cholera due to *V. Cholerae* 01 was children 2-9 years old, and the organism was isolated from more females than from males at all ages.

In contrast, cholera due to *V. cholerae* 0139 preferentially caused disease in adults 15 years and older, which indicated that this organism was new in this population. As with *V. cholerae* 01, *V. cholerae* 0139 was isolated from more females than males. The initial rapid emergence and predominance of *V. cholerae* 0139 was considered to possibly herald the start of the eighth pandemic of cholera. However, in just a year, the prevalence of *V. cholerae* 0139 decreased dramatically, with *V. cholerae* 01 resuming the role of the dominant cholera strain. The factors contributing to the dramatic decline in the prevalence of *V. cholerae* 0139 are not yet completely understood.

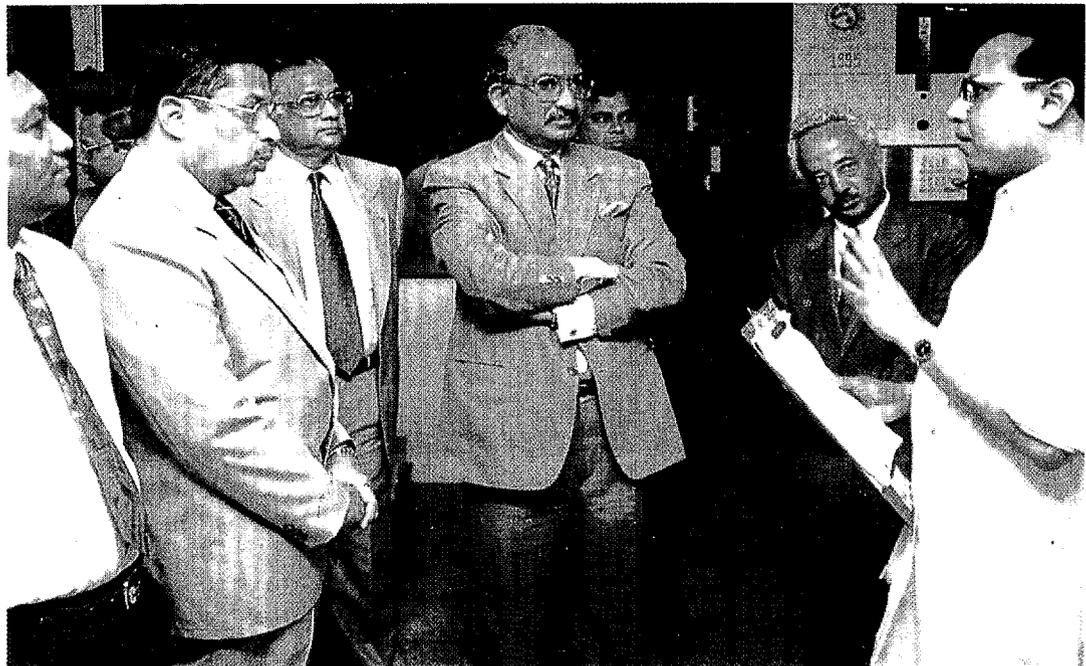
### Hyperimmune bovine colostrum (HBC) in the treatment of *Escherichia coli* and rotavirus diarrhoea

PIs: S.A. Sarker, L. Hammarström, T. Casswall, P.K. Bardhan, N.H. Alam, M.J. Albert, D. Mahalanabis and K. Gyr

Funded by: SAREC, Sweden

Rotavirus and enterotoxigenic *E. coli* continue to be major childhood pathogens resulting in considerable morbidity and mortality. Although oral rehydration therapy is safe and effective for most children with diarrhoea caused by those pathogens, it does not substantially reduce the severity or duration of diarrhoea. This has resulted in the use of drugs that are ineffective and potentially harmful. Passive immunity with secretory immunoglobulin preparations from immunized cow colostrum (HBC) as prophylaxis against different gastrointestinal infections has been previously assessed.

The purpose of this study is to investigate the efficacy, in a double-blind placebo-controlled trial, of orally administered anti-rotavirus and anti-*E. coli* HBC in children with acute diarrhoea caused by these



The Minister of Health and Family Welfare, Mr. Chowdhury Kamal Ibne Yusuf, and the Minister of Finance, Mr. M. Saifur Rahman visited the hospital in March, and pledged an additional \$500,000 to the Centre.

pathogens. Of the 80 programmed cases in each group (rotavirus and *E. coli*), 40 and 35 children, respectively, have been studied. If determined to be efficacious, this novel form of therapy has the potential as a useful, cost-effective adjunctive or alternative therapy for these infections.

#### Single-dose ciprofloxacin therapy of cholera caused by *V. cholerae* O1 or *V. cholerae* O139

PIs: W.A. Khan and M.A. Salam

Funded by: Bayer AG, Germany

This randomized, double-blind study compared the efficacy of a single 1g oral dose of ciprofloxacin versus a single 300 mg oral dose of doxycycline in the treatment of adults with severe diarrhoea caused by *V. cholerae* O1 or *V. cholerae* O139.

Clinical and bacteriologic failures were defined as persistence of watery stool and isolation of *V. cholerae*, respectively, beyond 48 hours of administration of the study drugs. Six hourly, daily, and total volume of watery stool, and the frequency and amount of vomiting were compared among the treatment groups. One hundred and thirty men with cholera due to *V. cholerae* O1 and 130 men with cholera due to *V. cholerae* O139 were studied.

The results of this study indicate that a single 1g dose of ciprofloxacin was an effective alternative to a single 300 mg dose of doxycycline in the treatment of adults with cholera.

#### Effect of a soluble fiber-supplemented oral rehydration solution in the treatment of acute non-cholera diarrhoea in children

PIs: N.H. Alam, R. Meier, D. Mahalanabis, P.K.

Bardhan, S.A. Sarker, H. Schriecler and K. Gyr

Funded by: SANDOZ Nutrition, Switzerland

There is considerable interest in the therapeutic potential of soluble fibers in a variety of conditions. The hypothesis of this study is that partially hydrolyzed guar gum (Sun Fiber) soluble fiber added to ORS will undergo fermentation and produce short-chain fatty acids. This will result in reducing the duration of diarrhoeal illness. In this controlled clinical trial, the effects of a soluble fiber-supplemented ORS in the treatment of acute non-cholera diarrhoea in children is under investigation. The clinical response, such as stool output, duration of diarrhoea, and ORS intake of the two groups will be compared.



*Centre scientists continue to examine nutrition issues in the hospital, laboratory and community, working especially on vitamin A and vegetable sources of protein.*

#### Efficacy of tetracycline in the treatment of cholera due to in vitro tetracycline-resistant strains of *Vibrio cholerae*

PIs: U. von Gierke, A.M. Khan and G.J. Fuchs

Funded by: USAID

This study is being conducted to evaluate the efficacy of tetracycline in patients infected with tetracycline-resistant strains of *V. cholerae* O1. Since 1991, the prevalence in Bangladesh of *V. cholerae* strains resistant to tetracycline has now increased to about 20%.

Because approximately 55% of orally administered tetracycline is excreted in faeces, it is hypothesized that tetracycline will be efficacious in treating cholera caused by tetracycline-resistant strains.

Adult patients with less than 24 hours' acute watery diarrhoea, with no history of intake of effective drugs, and with a positive darkfield examination are included. Sensitivity by the disk diffusion method, minimal inhibitory concentration (MIC) and faecal tetracycline concentration are done in cases with positive stool culture for *V. cholerae* O1. Patients with *V. cholerae* (tetracycline-sensitive and resistant) are treated with tetracycline 500 mg every 6 hours for 3 days. Excretion of *V. cholerae* and clinical efficacy are assessed. Sixty-eight subjects have been enrolled thus far.

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

PIs: M.A. Salam and W.A. Khan

Funded by: Bayer AG, Germany

The objective of this randomized, double-blind clinical trial is to compare the efficacy and safety of a paediatric suspension formulation of ciprofloxacin compared to a paediatric tablet formulation of amdinocillin pivoxil in the treatment of children aged 2-15 years with acute dysentery due to *Shigella*.

After baseline observations, children are to receive either 10 mg/kg of ciprofloxacin suspension every 12 hours or 10-20 mg/kg of amdinocillin pivoxil tablets every 6 hours, both drugs being administered for a total of 5 days.

Clinical failure is defined as persistence of symptoms for >72 h after starting treatment; or passage of six or more stools; or one bloody-mucoid or watery stool; or an oral temperature of >37.8°C on Study Day-5. Isolation of *Shigella* spp. on Study Day-3 or thereafter is defined as bacteriological failure.

**Therapeutic efficacy of oral 5-aminosalicylic acid in acute shigellosis**

PIs: M.R. Islam, P.K. Bardhan, M. Islam, K. Gyr and A.N. Alam

Funded by: USAID

The emergence of antibiotic resistance is a major obstacle to effective therapy of shigellosis. In this study, the efficacy of 5-aminosalicylic acid (ASA) in shigellosis was explored. Male patients aged 18-50 years with a history of acute bloody dysentery were randomized to receive either 5-ASA (Asacol) 800 mg thrice daily or a placebo for 5 days. All patients also received 1.0 g nalidixic acid every 6 hours for 5 days.

Sigmoidoscopy with histopathological examination was performed on admission and after 5 days of treatment. The number of clinical successes and failures were equally distributed in both the treatment and the placebo groups.

However, there was a trend of therapeutic benefits with 5-ASA among patients in whom the *Shigella* strains were resistant to nalidixic acid. Further analysis of data is continuing. More specific anti-inflammatory agents might have clinical benefits and should be studied in patients with shigellosis.

**Vitamin A loss in the urine of children with acute shigellosis**

PIs: A.K. Mitra, C.B. Stephensen, J.O. Alvarez, M.A. Wahed, M.A. Khaled and G.J. Fuchs

Funded by: USAID and the University of Alabama at Birmingham, USA

The aim of this study was to assess the vitamin A status and urinary excretion of vitamin A in childhood shigellosis. The study included 90 patients with bloody mucoid diarrhoea, 40 with watery diarrhoea, and 40 healthy controls, aged 6-72 months. Preliminary analysis of 45 of the patients with *Shigella* showed that the serum retinol was markedly depressed at admission and became normal at recovery. Urine samples taken every 24 hours showed significantly higher retinol excretion in patients with *S. dysenteriae* 1 than those with other *Shigella* species.

Significantly more retinol was excreted in malnourished children compared to their better-nourished counterparts. Urinary retinol was also greater among the children with high fever at admission compared to those with mild or no fever. These results indicate that serum retinol is transiently depressed in shigellosis, that a substantial loss of vitamin A in urine occurs in children with *Shigella*, and that the urinary loss is associated with fever, malnutrition, and abnormal kidney function.

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

PIs: S.A. Sarker, G.J. Fuchs, N.H. Alam, P.K. Bardhan, N. Dewan and D. Mahalanabis

Funded by: USAID

Although persistent diarrhoea accounts for 10-15% of all diarrhoea, it is responsible for 34-63% of all diarrhoea-related deaths among children in developing countries. The management of persistent diarrhoea is focused on maintaining hydration and nutrition.

The standard oral rehydration solution (ORS) recommended by the World Health Organization (WHO) contains relatively high concentrations of salt and glucose. There is concern that the standard WHO-ORS might cause a flow of extracellular body fluid into the intestine and worsen the diarrhoea.

The purpose of this study is to evaluate one of two reduced ORS preparations, glucose-based reduced osmolar ORS (Na and glucose 75 mmol/L each, osmolarity, 245 mOsmol/L) or a rice-based reduced osmo-

larity ORS (Na, 75 mmol/L; rice powder, 50 g/L; osmolarity, 170 mOsmol/L) compared to standard WHO-ORS (Na, 90 and glucose, 111 mmol/L, osmolarity, 311m Osmol/L. If reduced osmolarity ORS is determined to be beneficial in hastening recovery from persistent diarrhoea, this would be a therapeutic advance in the case-management of persistent diarrhoea.

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

PIs: P.K. Bardhan, D. Mahalanabis, S.A. Sarker, A.S.G.Faruque, M.J. Albert and K. Gyr  
Funded by: USAID

Hypochlorhydria predisposes to gastrointestinal infections. *H. pylori* infection is a major cause of human gastritis and is associated with gastric hypochlorhydria. A prospective, clinic-based and case-control study with age-matched community controls has begun to ascertain if *H. pylori* infection is a risk factor in acute or persistent diarrhoea in children.

The disease status is characterized by history, the <sup>13</sup>C-urea breath test, and specific serology in 100 children aged 3-24 months in each group with acute diarrhoea and persistent diarrhoea. Data about other potential confounding variables are also being collected. Data available from 122 children have been analyzed so far.

It appears that children infected with *H. pylori* are more than twice as likely to have persistent diarrhoea. The study is ongoing. Preliminary analysis indicates that the prevalence of *H. pylori* infection is about 30% among young children in Bangladesh.

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

PIs: R. Haider, I. Kabir, A.A. Hill, G.J. Fuchs and D. Habte  
Funded by: Swiss Development Cooperation

Bangladeshi mothers often give complementary foods to their infants at 1-12 weeks of age, which may decrease both the duration of total breast feeding as well as postpartum amenorrhoea. Focus group discussions have shown that early complementation occurs because mothers are either unaware of the benefits and techniques of breast feeding or are not supported in their efforts to breastfeed.

This study will train motivated mothers as peer counsellors (PCs) to counsel pregnant and lactating mothers on breast feeding and complementary feeding. If success-

ful, similar training and use of PCs may be recommended for mother and child health and family planning programmes elsewhere as a strategy to decrease diarrhoeal morbidity and improve infants' nutritional status.

**Vegetable protein-source for refeeding malnourished children recovering from shigellosis**

PIs: I. Kabir, R. Haider, I. Hossain, M.A. Khaled, D. Halliday and L.E. Underwood  
Funded by: Swiss Development Cooperation and International Atomic Energy Agency (IAEA), Austria

The relative efficacy of a standard reference diet recommended by WHO/FAO will be compared with two nutrient-dense diets, one with 15% energy as animal protein and the other based on plant protein with similar energy content and supplemented with micronutrients. After clinical recovery, children will be randomly assigned and fed one of the three study diets for three weeks. Anthropometry, serum proteins, insulin-like growth factor (IGF), IGF binding protein, body composition, and protein turnover will be measured and compared before and after the dietary supplementation.

Protein turnover will be assessed using stable isotopes <sup>13</sup>C leucine, <sup>13</sup>C bicarbonate, and <sup>2</sup>H leucine, and isotope enrichment in serum and breath samples determined by GC-mass spectrometry. Children will be followed over 3 months to assess morbidity and growth. The results of this study are expected to have policy implications in reducing adverse nutritional consequences of shigellosis, particularly in malnourished children.

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

PIs: S.A. Sarker, L. Hammarström, T. Casswall, P.K. Bardhan, N.H. Alam, M.J. Albert and K. Gyr  
Funded by: SAREC, Sweden

Infection with *H. pylori* is increasingly recognized as common among children in developing countries, with a prevalence of up to 45% in children aged less than one year. Infection with *H. pylori* is associated not only with gastritis, hypochlorhydria and peptic ulcer disease but also gastric cancer. In addition, a close association between *H. pylori* and chronic diarrhoea and growth-faltering in children has been reported. Effective, safe therapeutic options to eradicate this organism in children are needed. This community-based, double-blind, placebo-controlled trial was designed to investigate the efficacy of orally adminis-

tered anti-*H. pylori* HBC in children with *H. pylori* gastric infection documented by the urea breath test. Fifteen of the 60 programmed children have thus far been enrolled in the study.

**Prevalence of *H. pylori* infection in infants and family contacts in a poor Bangladesh community**

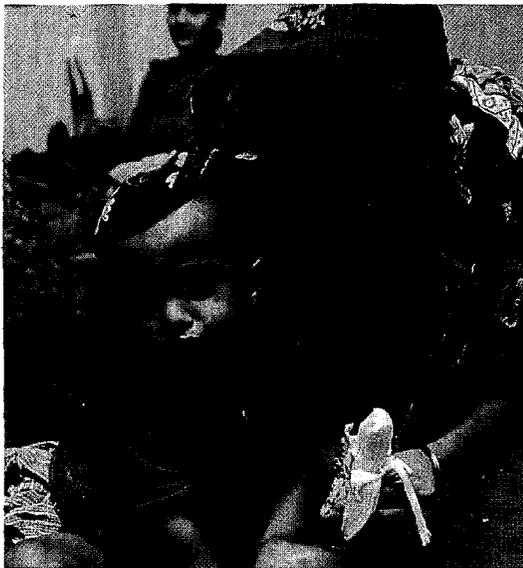
PIs: S.A. Sarker, M.M. Rahman, D.

Mahalanabis, P.K. Bardhan, P. Hilderrand,  
C. Beglinger and K. Gyr

Funded by: Swiss Development Cooperation

Although *H. pylori* is well established as an aetiological agent of type B gastritis and a predisposing factor for peptic ulcer, knowledge about its transmission is not fully understood. In this study, the prevalence of *H. pylori* infection was examined in the family members of index infants infected with this organism as indicated by positive 13C-urea breath tests (UBT). Infection rates were 82% and 91% in family contacts of the infected and noninfected infants respectively, the average infection rate being 85%, which is high.

No difference in infection rates was observed among the parents of the infected and noninfected infants. Fifty percent and 70% of families belonging to infected and noninfected infants, respectively, were found to have all members infected with *H. pylori* (p=NS). No evidence of sex predilection of infection was found.



*Perhaps bananas don't appeal to all children, even when good for them.*

These results indicate that in communities with high prevalence of *H. pylori* infection there is almost an equal infection rate among the family contacts of infected and noninfected infants, suggesting that environmental factors may be more important than intrafamilial transmission.



*Dr. George Fuchs, Director of the Clinical Science Division, and H.E. Mr. Kenneth Aspinall, High Commissioner of Australia, observe the use of the new "Infuso-feed balloon", to give ORS to a child unable to take it orally.*

**Evaluation of the Infuso-Feed balloon in the management of children with diarrhoea and malnutrition**

PIs: P.K. Bardhan and M.A. Islam

Funded by: AusAID

Persistent vomiting, apathy, anorexia and severe dehydration at times interfere with the delivery of oral rehydration and often require intravenous therapy. The use of continuous infusion of fluids through a nasogastric tube may enable health workers to avoid the use of intravenous therapy in these circumstances, but this approach demands nursing time and use of infusion pumps for reliable application.

This study tested a reusable device, the Infuso-Feed balloon, to deliver fluids for oral rehydration or nutritional rehabilitation to a group of 34 children with severe malnutrition and anorexia.

The device was well accepted, and was found to be a safe, inexpensive, reliable, and simple tool for delivery of ORS and milk formula and was successfully used for rehydration of dehydrated children. With some improvements and modifications, this device has the potential to improve ORS delivery and refeeding to

groups of patients who presently require more intensive and expensive treatment plans.

#### Development and validation of non-invasive tests to assess gastric acid output

PIs: S.A. Sarker, D. Mahalanabis, P.K. Bardhan,  
N.H. Alam, K.S. Rabbani, A. Kiber  
and K. Gyr

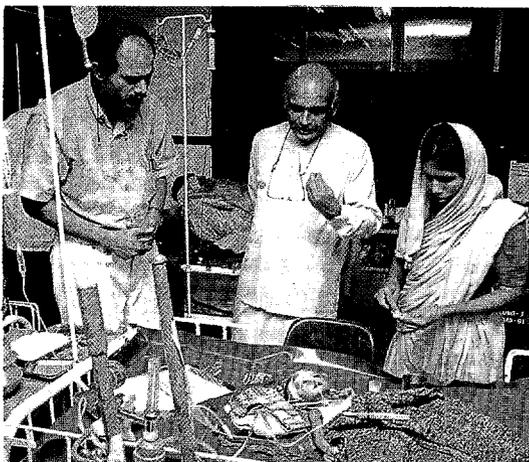
Funded by: Swiss Development Cooperation

The objective of this study was to validate Electrical Impedance Tomography (EIT) and Titratable Urinary Acid Output (UAO) as non-invasive and tubeless alternatives to the conventional intubation technique to assess gastric acid output.

In this study, 19 normal adults underwent four sets of experiments: (1) Standard intubation test and measurement of UAO, (2) EIT test, (3) Standard intubation test and measurement of UAO with prior omeprazole (an acid-inhibiting agent), and (4) EIT test with prior omeprazole treatment.

#### Results

(1) UAO: The subjects showing gastric secretion in response to stimulation with pentagastrin demonstrated a significant fall in UAO from the basal state. There was a significant correlation of gastric acid response as assessed by intubation test with simultaneous change in urine acidity (UAO). A complete anacidity of gastric acid output in response to pentagastrin was observed after pretreatment with omeprazole. A corresponding



*Dr. M. Salam, Chief Physician, demonstrates treatment of a seriously ill child on IV, to H.E. Mr. S.B. Atugada, the High Commissioner of Sri Lanka in Bangladesh.*

change in UAO (basal vs. stimulated) was also observed.

(2) EIT: There was a significant correlation of stimulated gastric acid output as assessed by intubation test and stimulated area under the curve (AUC) as calculated in EIT. As in the intubation test, omeprazole pretreatment diminished the change the pentagastrin-stimulated EIT value ( $1029 \pm 790$  without vs.  $121 \pm 185$  with).

The study demonstrated the predictable change of gastric impedance and UAO both in stimulated and inhibited conditions, and thus may be useful as non-invasive tests suitable for field use for measuring gastric acid secretion.

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

PIs: S.M. Akramuzzaman, F. Cutts, LSHTM  
and V. ter Meulen, University of Würzburg,  
Germany

Funded by: The European Union

This study investigates the role of preferential activation of type 2 T helper cells (TH2) as an underlying biological mechanism for excess delayed morbidity after measles. Morbidity will be monitored after acute measles or complicated measles and compared to healthy controls and controls with other diseases.

One hundred and ten children will be recruited in each group, and will be examined weekly until 6 months after recruitment. Preferential activation of TH2 will be evaluated by comparing IFN- $\gamma$  and IL-4 levels between the cases and controls at recruitment, at 6 weeks and at six months.

On a sub-sample of children aged 6-11 months ( $n=25$  per group), the study will measure the lymphoproliferative response to stimulation with measles virus and cytokine profiles on supernatants of cultured peripheral blood mononuclear cells (PBMCs).

Differences in the expression and regulation of CD4 and moesin will be assessed in this sub-sample of children with acute or complicated measles infection, and in 6- or 9-month-old recipients of standard titre measles vaccine ( $n=25$  in each group).

This will be done to investigate the hypothesis that down-regulation of these molecules is one of the determinants of the degree of immune suppression induced by wild or vaccine virus.

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

PI: S.M. Akramuzzaman

Funded by: Swiss Development Cooperation

A clinic-based, case-control study to evaluate whether health facility visit is a risk factor for measles transmission is being conducted. Two hundred and ninety four measles cases and 1,176 controls with other diseases will be recruited from the Clinical Research & Service Centre and from Dhaka Shishu (Children's) Hospital. Another 1,176 healthy controls will also be selected from the neighbourhoods of the cases.

The study will also validate a salivary IgM assay against serology (serum IgM) as a diagnostic test. A subsample of 80 measles cases and 80 controls will be used in this validation study. If validated, salivary IgM could be used as a non-invasive technique for the confirmation of measles in a variety of epidemiological studies on measles in developing countries.

**Studies on short-chain fatty acids in experimental cholera and shigellosis**

PIs: G.H. Rabbani, M.J. Albert, H. Rahman and M. Islam

Funded by: USAID

Short-chain fatty acids (SCFAs) are produced by the anaerobic fermentations of unabsorbed carbohydrates in the colon. Since SCFAs have been shown to possess a colonotrophic and an antibacterial effect against *Shigellae*, the role of SCFAs in the treatment of experimental *Shigella flexneri* 2a infection in rabbit was evaluated.

In this model, the cecum of an unstarved rabbit was obstructed and *S. flexneri* 2a (107/ml, 10 ml) was introduced directly into the proximal colon. Twenty-four hours after the bacterial infection, the rabbit was treated with colonic infusions of SCFA (50 mM acetate, 30 mM propionate, and 40 mM butyrate) every 6-8 hours for up to 96 hours.

Every 24 hours the rabbits were autopsied and clinical, histopathological, and bacteriological observations were made. Rabbits in the control group were similarly observed but were treated with a SCFA-free solution.

SCFA treatment significantly reduced the clinical severity of the dysenteric illness as indicated by a reduction

in fecal blood and mucus and improvement of other clinical signs, including rectal temperature, body weight, and fecal exudate.

Histological improvement of the colonic lesions by SCFA treatment was demonstrated by a significant ( $p < 0.01$ ) reduction in the severity of inflammation as reflected by a decrease in cellular infiltrations in the lamina propria, resolution of superficial ulcerations, reduction of congestion and exudation, and reduction of crypt abscess formation and necrotic changes.

Assessment of colonic inflammatory lesions by histologic grading indicated significantly more ( $p < 0.001$ ) autopsy specimens from the SCFA-treated rabbit had mild colitis, whereas severe grades of colitis predominated in the autopsies from the control group.

SCFA treatment also inhibited the growth of *Shigellae* (log CFU/ml) in the colonic lumen and in the mucosal tissue. It is concluded that SCFAs are useful therapeutic agents for rabbit shigellosis. SCFAs or their dietary precursors are currently being evaluated as potential therapeutic strategies for acute shigellosis in humans.

**Application of the deuterated retinol dilution technique to assess vitamin A requirements in adult healthy volunteers**

PIs: R.N. Mazumder, M.A. Islam, M. Haskel and K.H. Brown

Funded by: University of California, Davis, USA

To measure the change in plasma-specific activity of deuterated retinol (D4 retinol) over a period of 127 days and to estimate pool size and whole-body vitamin A disposal rates, 15 healthy adult volunteers of 18-20 years were enrolled after preliminary screening of their vitamin A status.

Following a 12-hour fast, subjects were admitted for assessment of their plasma retinol concentration and of the response of plasma retinol five hours after an oral dose of 1,000 micrograms of retinol.

During the study period, dietary intake of each subject was measured before each meal. Serum albumin and serum glutamic oxaloacetic transaminase (SGOT) were also measured before inclusion in the study.

Specimen analysis is now being completed in the Department of Human Nutrition, University of California, Davis.

### **A study on immunological effect of vitamin A and zinc in a placebo-controlled 4-cell trial**

PIs: S.K. Roy, Tasnim Azim, G.J. Fuchs, S.M. Akramuzzaman and M. Rahman

Funded by: USAID

This study is designed to evaluate the effect on immunity of vitamin A, and to compare this with a known immunopotent mineral, zinc, in a randomized double-blind study. Children aged 1-3 years without acute illness and wt/age between 61% and 70% of the NCHS standard are being enrolled. Baseline anthropometry and vitamin A status is assessed using the RDR test.

Each group consisting of 50 children either receives vitamin A (200,000 IU) over 7 days or 40 mg elemental zinc daily for 7 days, or both, or a placebo. After 8 weeks, tests of immunity are repeated. Unimmunized children are given measles vaccine, and serum antimeasles antibody is measured before and after supplementation. The study subjects are also followed for two months. Anthropometric measurements, morbidity and dietary data during this period are recorded and will be compared. Of the 85 subjects, 74 have completed the study.

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

PIs: G.J. Fuchs, D.S. Alam, K.M.A. Aziz, M. Yunus, M.A. Wahed and A. de Fransisco

Funded by: Opportunities for Micronutrient Intervention (OMNI)/USAID

Increased intake of dark-green leafy vegetables (DGLV) is promoted globally as a sustainable method to improve vitamin A (VA) status in developing countries. However, recent evidence indicates that this approach might fail to improve VA status as predicted. Dietary fat, essential for maximal utilization and absorption of ingested provitamin A from DGLV, is very low in the same populations in which VA deficiency is highly prevalent around the world.

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

Six hundred pregnant/lactating women, half of whom will receive supplemental dietary fat, will be enrolled. Longitudinal assessment of provitamin A intake, quan-

tification of dietary fat, retinol/carotenoids concentration of maternal/infant plasma and breastmilk, maternal/infant anthropometry, and assessment of maternal and infant infection morbidity including parasitosis will be assessed.

### **Hospital Surveillance Programme**

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

Funded by: UNDP/WHO

More than 110,000 patients attend the ICDDR,B diarrhoeal treatment centre in Dhaka each year. The Hospital Surveillance Programme provides data on diarrhoeal diseases which: (1) are reported to the Government of Bangladesh 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.

Patients (or their parents) are interviewed by the surveillance team to obtain information on causative agents and drug sensitivity, and patients' socioeconomic and demographic characteristics, housing and environmental conditions, feeding practices of infants and young children, 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. During 1995, patients enrolled in this programme totalled 4,590.

An epidemic in April and May was due primarily to enterotoxigenic *E. coli* (ETEC) and enteropathogenic *E. coli* (EPEC). The year's epidemic of cholera was caused mainly by *V. cholerae* O1. The most common species of *Shigella* was *S. flexneri* (48%). The table (overleaf) shows the main aetiological agents isolated from these patients. Other than in epidemics, data for pathogenic *E. coli* have not previously been included in the surveillance. However, routine screening of ETEC and EPEC is to be incorporated into the surveillance system commencing January 1996.

### **Effect of short-chain fatty acids (SCFAs) from pectin or unripe banana on persistent diarrhoea in children**

PIs: G.H. Rabbani, G.J. Fuchs, B. Zaman and N. Majid  
Funded by: USAID

Persistent diarrhoea is a problem of major importance to children in developing countries. The pathogenesis



*A solicitous grandmother takes over the dispensing of Oral Rehydration Solution. A family member is always present at the patient's side, to provide support while at the same time learning the use of ORS ... for next time.*

of the illness is poorly understood, but involves multiple endogenous and exogenous factors. Because of the known enterotrophic and colonotrophic actions of SCFAs, it is hypothesized that SCFAs administered as their metabolic precursors in fiber-rich diets might be useful in the treatment of persistent diarrhoea in children. So far 12 children have been evaluated with persistent diarrhoea treated with either pectin, unripe and uncooked banana, or a placebo in a double-blind, randomized trial. This study includes clinical and bacteriologic evaluation of children as well as determination of macronutrient absorption by a 72-hour metabolic balance study. SCFAs in the stool will also be quantified.

#### **Oxidative stress in bacterial translocation**

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

Funded by: USAID

Oxidative stress has been implicated in many human diseases and has recently been found that this phenomenon is also associated with sepsis perhaps due to bacterial translocation. The purpose of this study was to investigate the relationship of oxidative stress and bacterial translocation, using a rabbit model. Study animals were placed on a diet deficient in protein and energy for six weeks and indicators of oxidative stress

were measured in blood and compared with their ad libitum-fed counterparts.

Lipid peroxidation, a measure of oxidative stress, was assessed by thiobarbituric-reacting substances (TBARS). The TBARS values of the control animals fed ad libitum were significantly higher than the energy-protein-restricted group ( $3.74 \pm 3.12$  vs.  $0.91 \pm 0.34$   $\mu\text{mol/g}$ ). Higher TBARS values indicate higher production of oxygen-free radicals, which are involved in the basic mechanisms of oxidative stress. Further investigation is in progress to assess bacterial translocation in these animals.

#### **Development of bioelectrical impedance analysis (BIA) method to assess hydration status in humans**

PIs: M.A. Khaled, G.J. Fuchs, I. Hossain and I. Kabir

Funded by: USAID

Current methodologies to assess dehydration due to acute watery diarrhoea provide only approximate estimations or are limited by relatively high cost, invasiveness, or the need for high technical expertise or equipment.

A dual frequency BIA method was applied on 19 adult patients (12 male and 7 female) aged  $30 \pm 8$  years with acute watery diarrhoea and severe dehydration as

**Aetiological agents isolated from patients  
in the  
surveillance programme in 1995**

	Number of patients	<i>V. cholerae</i> O1	<i>V. cholerae</i> 0139	<i>Shigella</i>	Other vibrios	Rotavirus	<i>Salmonella</i>
JANUARY	245	31	0	29	28	75	5
FEBRUARY	217	9	0	17	45	61	3
MARCH	364	32	3	23	50	37	7
APRIL	631	116	6	59	79	55	9
MAY	510	107	12	41	54	48	2
JUNE	334	36	5	34	59	26	9
JULY	412	54	1	45	52	62	6
AUGUST	536	130	2	39	59	64	13
SEPTEMBER	403	110	4	27	33	23	8
OCTOBER	334	75	6	39	52	15	5
NOVEMBER	305	51	22	45	23	26	6
DECEMBER	299	35	10	27	19	55	7
<b>TOTAL</b>	<b>4,590</b>	<b>786</b>	<b>71</b>	<b>425</b>	<b>553</b>	<b>547</b>	<b>80</b>
	%	17.1	1.5	9.3	12.0	11.9	1.7
	114,750	19,650	1,775	10,625	13,825	13,675	2,000

\*Extrapolated from a systematic surveillance of all patients attending the treatment facility

assessed clinically according to current WHO guidelines. Thirteen proved to have cholera.

All patients were managed initially with intravenous cholera saline and appropriate antibiotics. After initial hydration they were maintained by rice-ORS. All patients recovered uneventfully. Changes in body water compartments, i.e. total body water (TBW), extracellular water (ECW) and intracellular water (ICW), from admission to 24 hours after, were measured by bioelectrical impedance analysis (BIA).

These parameters showed that the dehydrated patients with cholera gained significantly more water than the non-cholera group. It was concluded that cholera patients had significantly greater depletion of ICW, which could 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 characterization of severity of dehydration than current clinical criteria.

#### **Study to determine shelf-life of precooked ready-to-mix rice-based oral rehydration salts (ORS) packets**

PIs: S. Islam and A.S.G. Faruque

Funding: Swiss Development Cooperation

It is important to determine the shelf-life of precooked ready-to-mix rice-based ORS in terms of its stability over a defined period of time. ORS was studied at different conditions for three months. To prepare the packets, cooked rice was dried and ground to a fine powder. The salt ingredients were mixed according to the WHO formulation. For each half litre packet - 10g glucose was replaced by 25g of instant cooked rice powder. The packets were maintained at different environmental conditions in 30 households of varying socioeconomic status for three months. Two packets from each family were collected at monthly intervals for examination.

Physical characteristics, such as colour and solubility, remained the same throughout the 3-month study period. However, in the third month, flavour was slightly changed. Electrolyte concentrations after preparation of the solution remained the same at the end of the first, second and third month.

However, progressive but minimal increase in moisture content of the packets was noted over the months. The increase in moisture was less when the mixture was packaged in double thin polythene bags compared to a single one. It is concluded that, over a 3-month period,

ready-to-mix rice-based ORS remains stable and can, therefore, be stored and used at the household level.

*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 regarding the sodium concentration and total osmolarity. Recent studies have suggested the possible superiority of different ORS solutions of reduced sodium and osmolarity compared to standard WHO-ORS, although the results are not conclusive.*

*ICDDR,B is participating in two different, but related, multicentre trials supported by UNICEF, WHO, and Applied Diarrhoeal Disease Research (ADDR) to evaluate the efficacy and safety of reduced osmolarity ORS (Na+ 75, glucose 75 mmol/L; osmolarity 245 mosmol/L) compared to the standard WHO-ORS (Na+ 90, glucose 111 mmol/L; osmolarity 311 mosmol/L) formulation.*

*The different ORS solutions will be assessed in a) adults with cholera, and b) children with watery diarrhoea of any cause. ICDDR,B is the only study site participating in both studies. It is expected that the results of this study will determine whether reduced osmolarity ORS should become the "new" standard ORS.*

#### **Clinical trial to evaluate the efficacy of reduced osmolarity ORS solution in adult patients with cholera [Multicentre study].**

PIs: N.H. Alam, R.N. Majumder and G.J. Fuchs  
Funded by: UNICEF/USAID

ICDDR,B is participating in a multicentre double-blind, randomized trial to evaluate reduced osmolarity ORS compared to standard WHO-ORS in adult cholera patients. Of the 300 patients from the different study sites, 150 patients will be studied at the Centre. Adult cholera patients attending the treatment centre, in Dhaka with a history of watery diarrhoea of less than 24 hours' duration are recruited. All intakes and outputs including ORS, plain water, food, stool, urine and vomitus, are measured. All patients will receive oral erythromycin. Outcome variables will be compared between the two ORS groups.

#### **Clinical trial to evaluate the efficacy of reduced osmolarity ORS solution in children with acute watery diarrhoea [Multicentre study].**

PIs: R.N. Majumder, N.H. Alam and G.J. Fuchs  
Funded by: UNICEF/USAID

A multicentre double-blind randomized study has been undertaken to evaluate the efficacy and safety of

reduced osmolar ORS compared to standard WHO-ORS in children 1 to 24 months old with acute watery diarrhoea. Of the total 600 patients from the different study sites, 120 patients will be studied at the ICDDR,B treatment centre in Dhaka.

Children attending the Treatment Centre, in Dhaka with a history of watery diarrhoea of less than 72 hours' duration are recruited. The study will be contin-

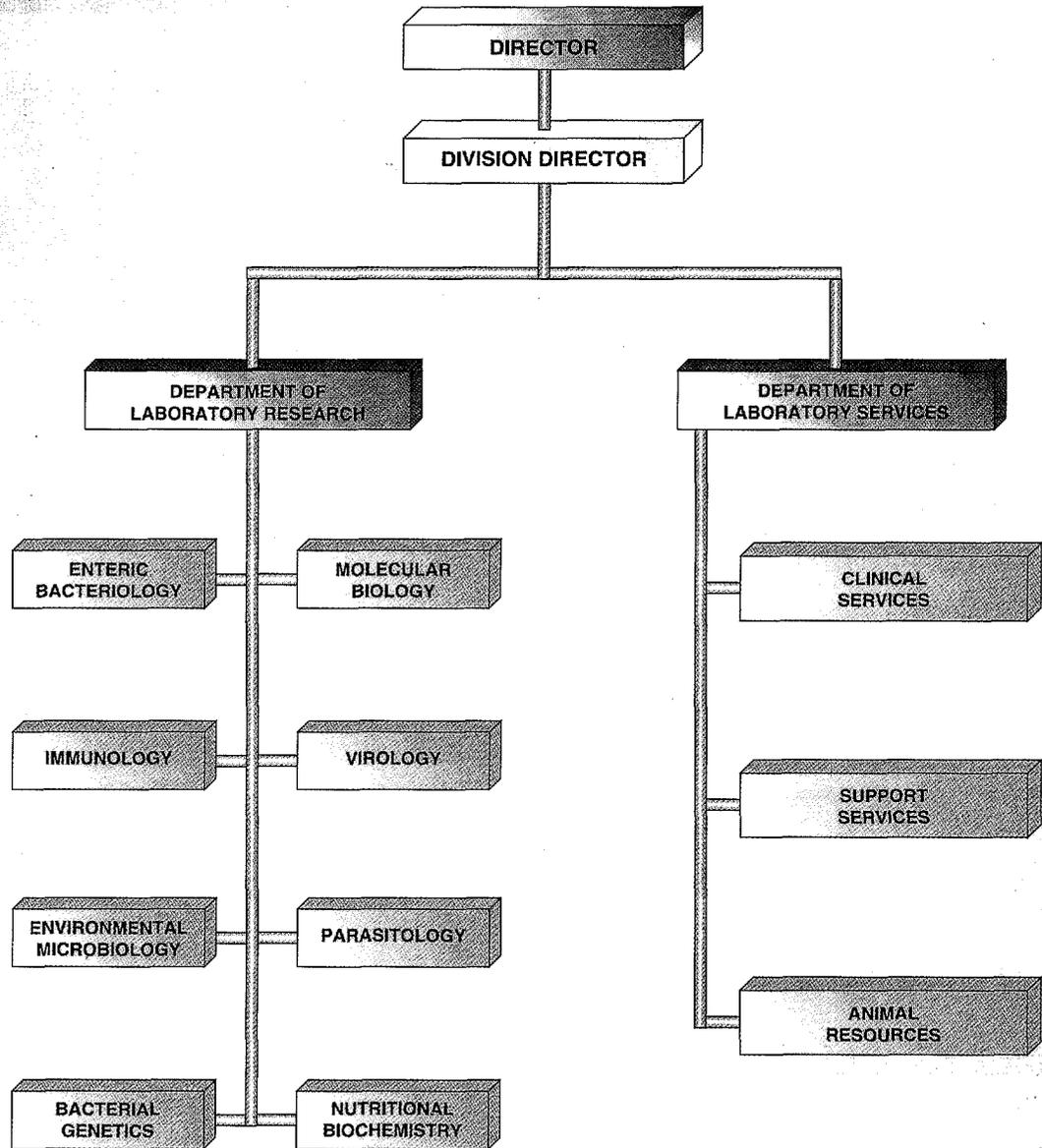
ued until the cessation of diarrhoea. All intakes and outputs, including ORS, plain water, food, stool, urine and vomitus, are measured.

After completion of the study, important variables (e.g. stool/kg, duration of diarrhoea, unscheduled I.V. fluid) will be compared between the groups. Of the 120 patients to be studied at ICDDR,B, 62 patients have been enrolled so far.



*During the July-October epidemic, crowds of patients and concerned relatives thronged the entrance to the overloaded hospital.*

# 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, nutrition-related problems, respiratory tract infections, and reproductive tract infections;
- ◆ 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.

To reflect the dichotomy of the functions of the Division, it is organized 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 two international and 27 national-level scientists and 121 support staff.

During the year, six studies were completed and 16 studies are ongoing. There are currently 20 collaborative projects, both formally and informally allied with 24 overseas institutions.

### **Division Highlights**

- An oligonucleotide synthesizer, which is used to synthesize DNA, has been put into operation in the research laboratories.
- An autoanalyzer has been installed in the clinical biochemistry laboratory for rapid assays of an increased number of biochemical parameters.
- Specimen reception and report delivery in the outpatient service area have been computerized for better service.
- An international training course on Laboratory Diagnosis of Common Diarrhoeal Disease Agents was held with participants from several Asian and African developing countries.

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## Major Achievements of the Division in 1995

□ The structure of the capsule and the genetics of the somatic antigen synthesis of *Vibrio cholerae* 0139 Bengal, the recently discovered aetiologic agent of epidemic cholera, have been determined in the laboratories of collaborating scientists overseas. Apart from several sugars, the capsule contained two unique components, colitose and D-galactose 4,6-cyclophosphate.

Fourteen of the 17 genes involved in the somatic antigen synthesis of *V. cholerae* 01, the traditional causative agent of cholera, were absent in *V. cholerae* 0139. These data suggest that *V. cholerae* 0139 is derived from *V. cholerae* 01 by deletion of some genes and acquisition of novel genes.

□ Several water isolates of *Aeromonas trota*, which crossreacted with *V. cholerae* 0139 Bengal, were identified. These isolates are further being characterized to study the evolution of *V. cholerae* 0139.

□ A survey of cytolethal distending toxin (CLDT) producing *Escherichia coli*, a newly described category of toxigenic *E. coli*, found that it could be detected in 3.1% of children with diarrhoea and in 0.93% of controls, thereby showing no association with diarrhoea ( $p=0.082$ ).

However, most of the CLDT+ *E. coli* possessed virulence properties of enteropathogenic *E. coli* (EPEC), which suggests that CLDT may be an additional virulence factor of certain EPEC.

□ A sensitive and specific monoclonal antibody-based enzyme immunoassay has been developed for the enterotoxin of enterotoxigenic *Bacteroides fragilis*, a newly described aetiologic agent of diarrhoea.

□ Polymerase chain reaction (PCR) assays have been established for detection and differentiation of pathogenic and nonpathogenic varieties of *Entamoeba histolytica* from stool.

□ Ribotyping of *V. cholerae* 01 isolates suggests that some ribotypes are more common among isolates obtained during epidemic periods than during nonepidemic periods. This suggests that there might be epidemic clones of *V. cholerae* 01.

□ A killed oral enterotoxigenic *Escherichia coli* (ETEC) vaccine consisting of the B-subunit of cholera toxin (CT) and colonization factor antigens (CFAs) of *E. coli* were tested in adult Bangladeshi volunteers for reactivity and immunogenicity. The vaccine was well tolerated, and the majority of volunteers showed an immune response to the vaccine.

□ Immunohistopathological studies carried out in patients with shigellosis suggest that complex humoral, cellular and inflammatory responses are elicited during the disease and that these continue even after the disease is clinically resolved. Cell-mediated immune responses are more important in shigellosis than was previously recognized.

□ Microbiological studies of duckweed-treated waste water suggest that duckweed treatment is an effective way of reducing faecal coliform count. Duckweed grown on wastewater was also found to be a safe fish feed.

□ A number of tests related to assessment of vitamin A status have been established. Studies on vitamin A have shown that about 60% of Bangladeshi infants are vitamin A-deficient.

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### DEPARTMENT OF LABORATORY RESEARCH

Head: M. John Albert

The Department of Laboratory Research comprises the laboratories of:

Enteric Bacteriology	Immunology	Environmental Microbiology	Bacterial Genetics
Molecular Biology	Virology	Parasitology	Nutritional Biochemistry

The aims, objectives, and major activities of each are listed under each laboratory.

### Enteric Bacteriology Laboratory

Head: M. John Albert

The major activities of the laboratory include studies on (1) bacterial causes of diarrhoea, (2) pathogenic mechanisms of diarrhoea, and (3) bacterial strain differentiation for epidemiological purposes, and development of simple and improved diagnostic tests for enteric bacterial pathogens.

#### Studies on *V. cholerae* O139 Bengal

PI: M.J. Albert

CIs: A. Weintraub (Karolinska Institute, Sweden) and P. Manning (University of Adelaide, Australia)

Funded by: The Government of Japan

*V. cholerae* O139 Bengal is the recently discovered second aetiologic agent of cholera. Collaborative studies have been conducted on the structure of the capsule of *V. cholerae* O139 with Dr. Weintraub (Sweden) and on the genetics of somatic antigen synthesis with Dr. Manning (Australia).

Apart from several sugars, the capsule contained two unique components, colitose and D-galactose 4,6-cyclophosphate. Fourteen of the 17 genes involved in the somatic antigen synthesis of *V. cholerae* O1, the traditional causative agent of cholera, were found to be deleted in *V. cholerae* O139. These studies suggest that *V. cholerae* O139 is derived from *V. cholerae* O1 by deletion of some genes and acquisition of novel genes.

#### Bacteriophages specific for *V. cholerae* O139 Bengal

PI: M.J. Albert

Funded by: The Government of Japan

Studies on phages of *V. cholerae* O1 are of historical interest. Phages have been used in the differentiation of classical and El Tor biotypes of *V. cholerae* O1, and in strain discrimination in epidemiological studies. Even though *V. cholerae* O139 shares striking similarities with *V. cholerae* O1 El Tor, the phages of *V. cholerae* O1 do not attack *V. cholerae* O139.

Therefore, lytic phages were sought that will specifically attack *V. cholerae* O139. Several lytic phages were isolated from stools of *V. cholerae* O139-infected cholera patients, and four of these were characterized in detail. These phages belonged to the *Podoviridae* family and were identical by a variety of characteristics.

On testing, they attacked all capsulated *V. cholerae* O139 isolates studied, and noncapsulated variants were not lysed. *V. cholerae* O1 isolates and other bacteria were not attacked. Thus, these phages will be useful for con-

firmatory diagnosis of *V. cholerae* O139 and for differentiation of noncapsulated variants of *V. cholerae* O139.

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

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

CI: J.B. Kaper (Center for Vaccine Development, University of Maryland, USA)

Funded by: USAID

Enteropathogenic *Escherichia coli* (EPEC) are a major cause of diarrhoea in infants in developing countries. To develop simpler diagnostic techniques, we targeted two virulence antigens of EPEC bundle-forming pilus (BFP) and intimin, against which monoclonal antibodies (MAbs) are being produced. MAbs have already been successfully produced to BFP, which are being used in the development of immunodiagnostic tests.

#### Biochemical fingerprinting in epidemiological studies of bacterial diarrhoeal pathogens

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

CIs: R. Möllby and I. Kühn (Karolinska Institute, Sweden)

Funded by: SAREC

The biochemical fingerprinting technique has been applied for strain differentiation of a variety of enteric bacteria, such as *V. cholerae* O1 and *V. cholerae* O139, *Hafnia alvei*, *Providencia alcalifaciens*, *Shigella* species, and *Aeromonas* species.

In most cases, as expected, it was possible to discriminate strains. Studies with *Aeromonas* species suggest that water isolates and human diarrhoeal isolates form two distinct groups, and may point to the potential aetiologic role of human isolates in diarrhoea.

#### Immunology Laboratory

Head: F. Qadri

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

PIs: F. Qadri, T. Azim, M.J. Albert, M.A. Salam, A.N. Khan and R.B. Sack (JHU)

CI: A.M. Svennerholm (University of Göteborg, Sweden)

Funded by: SAREC

Local and systemic immune responses were being studied in adult patients with cholera caused by *V. cholerae* O1 and O139. The kinetics of the response are

**LSD** being studied in the acute stage and at convalescence to specific antigens, such as lipopolysaccharide (LPS), cholera toxin (CT) and the putative adhesion antigen, mannose-sensitive haemagglutinin (MSHA). A response is seen in specific antibody-secreting cells (ASC) isolated from peripheral blood, which peaks at around 7 days after the onset of cholera.

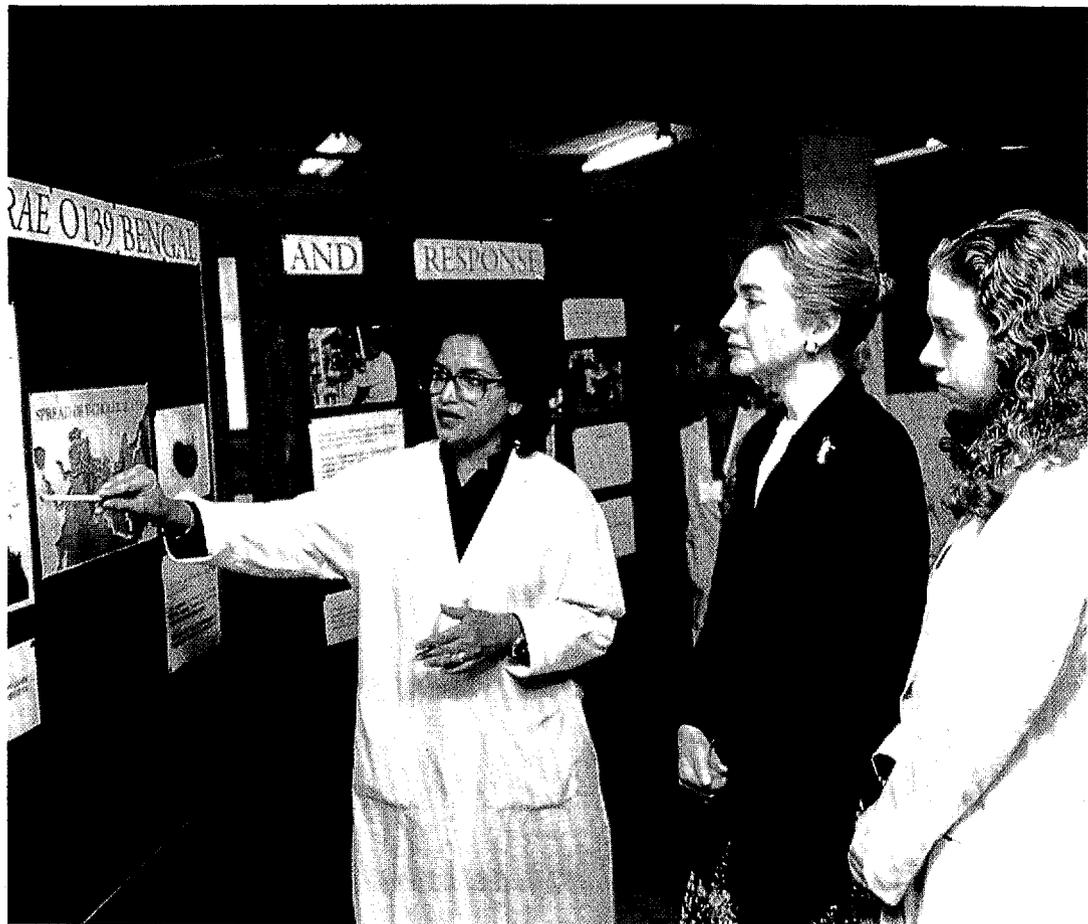
The response to LPS is only to the homologous serogroup with which the patient has been infected. Patients show a response to CT and an appreciable increase in MSHA-specific ASC. A comparison of these responses with those obtained with lymphocytes isolated from the gut is being carried out.

#### Production of monoclonal antibodies

PIs: F. Qadri and T. Azim

Funded by: USAID

A monoclonal antibody (MAb) ICT7 has been produced and used in an immunodiagnostic assay that can detect Shiga toxin in *Shigella dysenteriae* type 1 and enterohaemorrhagic *E. coli* strains positive for Shiga-like toxin I. The assay could also be used to detect toxin in stools of patients with *S. dysenteriae* type 1 infection. At present there is no rapid assay for the detection of enterotoxigenic *B. fragilis* (ETBF), a cause of acute diarrhoeal disease. A specific MAb ICT11 produced against the toxin of ETBF was used in an



*Dr. F. Qadri discusses the new cholera strain, V. Cholerae O139, which emerged in the subcontinent in late 1992, with the First Lady of the United States, Hillary Rodham Clinton, and her daughter, Chelsea.*

immunodiagnostic assay. The test, when evaluated using 115 diarrhoeal stools, showed a specificity of 100% and a sensitivity of 98%. With the availability of MAb ICT11 and the rapid immunoassay, it should now be possible to screen for ETBF in diarrhoeal cases to define its aetiological importance better.

**Safety and immunogenicity of an oral bivalent B subunit *V. cholerae* O1/O139 whole cell (BO1/O139 WC) vaccine in adult Bangladeshi volunteers**

PIs: F. Qadri, P.K. Bardhan, R.B. Sack and M.J. Albert  
 CIs: A.-M. Svennerholm and J. Holmgren  
 (University of Göteborg, Sweden)  
 Funded by: The European Union (EU)

A study of the safety and immunogenicity of the oral B-subunit and whole cell bivalent cholera vaccine has been initiated. A total of 40 adult Bangladeshi volunteers will be studied. Twenty volunteers will be immunized with the BO1WC cholera vaccine and 20 with the bivalent BO1/O139 WC vaccine. Until now, 20 volunteers have been recruited in the study and the systemic and local immune responses are being studied.

**Environmental Microbiology Laboratory**

Head: M.S. Islam

The Environmental Microbiology Laboratory provides interdepartmental services for testing environmental samples supplied by the Clinical Sciences and Community Health divisions. Environmental samples from various national and international institutions in Bangladesh are also tested in this laboratory.

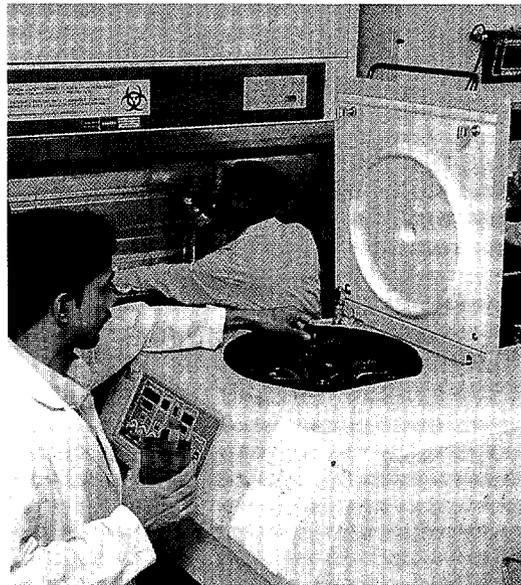
**Microbiological investigation of duckweed project in Mirzapur**

PI: M.S. Islam

Funded by: Swiss Development Cooperation (SDC)

Duckweed is a group of tiny free-floating plants belonging to the family *Lemnaceae* and has long been recognized as a potential source of high-protein feed for animals. A project on *Lemnaceae*-based wastewater treatment is being conducted in Tangail, Bangladesh.

Wastewater-grown duckweed is used as feed in fish culture ponds. The fish are regularly harvested and sold in the market. However, there were no data on the bacteriological quality of the fish, the duckweed or the water at this fish culture farm. A bacteriological study was designed to assess the quality of the duckweed, the water in which it is grown and the fish to which they are fed. A total of 11 spots — five from waste-



*In the Immunology Laboratory work continues on immune responses in patients with *V. Cholerae* O139; and to develop monoclonal antibodies for rapid diagnosis of Shigella and *E. coli**

water areas and six from non-wastewater areas — were selected for this study. Water, duckweed and fish samples were collected once a month for one year (May 1994 to April 1995) and processed, following standard procedures, for faecal coliform concentration.

The results in water, duckweed and fish were similar in both wastewater and non-wastewater sources except in raw wastewater. The mean faecal coliform count in raw wastewater was  $4.57 \times 10^4$ /ml, which was reduced to  $<10^2$ /ml after treatment with duckweed. The potential for transmission of diseases from wastewater duckweed and fish is no greater than that for non-wastewater duckweed and fish.

**Survey of culturable *V. cholerae***

PI: M.S. Islam

Funded by: Belgian Administration for Development Cooperation (BADC)

This study investigated culturable *V. cholerae* O1 and *V. cholerae* O139 in an aquatic environment of an endemic area of Bangladesh. Various environmental samples, e.g. plant, water, phytoplankton, zooplankton, snails, and oysters were collected at 15-day intervals from four selected sites in a cholera-endemic area of Bangladesh. All samples were cultured on thiosulphate

**LSD** citrate bile-salt sucrose (TCBS) and taurocholate tellurite gelatine agar (TTGA) media following standard procedures. The preliminary data showed that *V. cholerae* non-O1 and *V. mimicus* are very common in these pond ecosystems. No *V. cholerae* O1 was isolated and *V. cholerae* O139 rarely so.

#### **Role of various aquatic flora, fauna and physicochemical conditions of water in maintaining cholera in Bangladesh**

PI: M.S. Islam

Funded by: Swiss Development Cooperation (SDC)

This study investigates the role of various aquatic flora, fauna and physicochemical factors of water in maintaining the endemicity and seasonality of cholera in Bangladesh. Various environmental samples, e.g. plant, water, phytoplankton, zooplankton, snails, oysters, etc., were collected every 15 days from four closed water systems in Matlab, Bangladesh.

The culturable and non-culturable *V. cholerae* O1 and *V. cholerae* O139 were detected using polymerase chain reaction (PCR), fluorescent antibody (FA) and conventional culture techniques. Various physicochemical parameters of water, e.g. pH, temperature, salinity, etc. were also monitored routinely. The preliminary data show that *V. cholerae* O1 is associated with various components of the aquatic environment in a non-culturable but viable form.

#### **Bacterial Genetics Laboratory**

Head: Z.U. Ahmed

#### **Evaluation of live oral cholera vaccine candidates in rabbit RITARD model**

PIs: Z.U. Ahmed, R.B. Sack, M.M. Hoque,  
M.H. Rahman and A.S.M.H. Rahman

Funded by: WHO

Live oral candidate vaccine strains of *V. cholerae* O1 were studied with respect to their colonization of rabbit ileum, the premise being that a vaccine strain with good colonization ability will be likely to provide better protection. Isogenic pairs of strains with defects in potential colonization factor genes, such as toxin coregulated pilus (*tcpA*), mannose-sensitive hemagglutinin (*mshA*) and iron-regulated outer membrane protein (*irgA*), were included in experiments aimed at determining colonization ability and protective potential of the strains.

Results showed a good correlation between colonization and protective efficacy, suggesting that this property should be optimally retained in a vaccine strain.

#### **Molecular Biology Laboratory**

Head: S.M. Faruque

The Molecular Biology Laboratory is involved in the development and application of molecular techniques to identify and characterise diarrhoeagenic organisms. Besides carrying out research within protocols developed in this laboratory, the staff also provides technical support to other protocols that involve molecular techniques. This laboratory also actively collaborates with the Community Health and Clinical Sciences divisions in materializing research protocols.

The technical facilities available range from gel electrophoresis, nucleic acid preparation, hybridisations using both radiolabelled and nonradioactive probes to the most sophisticated techniques of DNA sequencing and DNA amplification by polymerase chain reaction (PCR). Recent diagnostic techniques routinely used include DNA probe assays of diarrhoeal pathogens, ribosomal RNA fingerprinting (ribotyping) for differentiating among strains as an aid to epidemiological studies, and PCR assays for rapid identification of diarrhoeal pathogens.

#### **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 to identify enteric pathogens. The aim is to develop and standardize rapid and sensitive diagnostic techniques for different enteric pathogens and test the applicability of these techniques in clinical and epidemiological studies. PCR assays have been standardized for various enteric pathogens, including *Shigella*, *E. coli*, and toxigenic *V. cholerae* O1 and *V. cholerae* O139 strains. The assays are specific and sensitive enough to detect as few as 10 bacterial cells.

The PCR assay for *V. cholerae* O1 has been found to be applicable in environmental studies to detect cholera toxin-producing *V. cholerae* in environmental water samples, where *V. cholerae* cannot be detected by conventional culture techniques. To facilitate further studies, new PCR assays for the genes for Zonula Occludens Toxin (*zot*) and the toxin coregulated pili (*tcpA*) have been developed and standardized. PCR assays based on the amplification of intergenic spacer region of rRNA genes provide a rapid technique for differentiating among various strains of enteric pathogens.

**Characterisation of epidemic strains of *Vibrio cholerae* O1 and *V. cholerae* 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 characterize epidemic strains of *V. cholerae* in Bangladesh and other countries based on genetic and phenotypic characteristics. Toxigenic *V. cholerae* strains have been collected from various regions of the world, and these are being analyzed to study their genetic relationship and their contribution to cholera epidemics. Development of a numerical ribotyping scheme has facilitated studies on the molecular epidemiology of *V. cholerae*. Further studies are underway to determine possible genetic and phenotypic differences among epidemic strains and toxigenic strains collected during inter-epidemic periods.

**Virology Laboratory**

Head: Leanne Unicomb

The principal interest of the Virology Laboratory is viral diarrhoea, with particular emphasis on studies of group A rotavirus. The laboratory performs diagnostics for rotavirus and also conducts epidemiological analyses and laboratory-based studies of particular rotavirus strains. Apart from studies of viral diarrhoeal agents, other areas of research are studies of respiratory viruses, measles virus, and poliovirus initiated by other scientific divisions of the Centre.

**Disease burden of rotavirus infection among Bangladeshi children and the implications for future vaccine programmes**

PIs: L. Unicomb, A.S.G. Faruque, P. Kilgore  
and R. Glass (Centers for Disease Control,  
Atlanta, GA, USA)

Funded by: The Government of Japan

Comprehensive testing of stool samples for rotavirus from the surveillance system of the Clinical Research and Service Centre (CRSC) began in 1990. Data for 1990-1994 were analyzed to determine the role of rotavirus as a cause of diarrhoea to assess the disease burden and to estimate the possible effect of vaccines.

Rotavirus accounted for 24% of hospitalizations at CRSC, and most children (90%) were found to have been infected by the age of two. Rotavirus was found to cause diarrhoea as severe as that caused by other diarrhoeal agents. It was estimated that approximately 31 million episodes of rotavirus-associated diarrhoea

occur annually and that a vaccine may prevent four million episodes of severe rotavirus-associated diarrhoea each year.

**Severity of mixed infections of rotavirus with other diarrhoeal pathogens**

PIs: L. Unicomb and S.M. Faruque

Funded by: The Government of Japan

During a one-year period, samples from Matlab children with diarrhoea were tested for a wide range of diarrhoeal pathogens. We examined the severity of diarrhoea in children aged less than two years who had infections with rotavirus only and rotavirus mixed with diarrhoeagenic *E. coli*, *V. cholerae* O1, or *Shigella*. We found no synergistic effect of rotavirus with other pathogens, yet rotavirus *V. cholerae* infections were similar to *V. cholerae* infections, and rotavirus-*Shigella* infections were intermediate in severity between rotavirus and *Shigella* infections alone.

**Possible association of astrovirus with persistent diarrhoea**

PIs: L. Unicomb, T. Azim, A. Islam, and M.J. Albert

Funded by: The Government of Japan

Specimens were examined from patients with persistent diarrhoea, from patients with acute diarrhoea and from control patients without diarrhoea for the presence of astrovirus. Although only a preliminary analysis has been performed, it appears that astroviruses are present in at least 10% of specimens from persistent diarrhoea patients (collected on the day of presentation to the hospital) compared to only 2% of specimens from patients with acute diarrhoea and 2% of control patients without diarrhoea.

**Parasitology Laboratory**

Head: R. Haque

**Rapid diagnosis of pathogenic *Entamoeba histolytica***

PI: R. Haque

CI: W.A. Petri, Jr. (University of Virginia,  
USA), P.K. Bardhan and S.M. Faruque

Funded by: Swiss Development Cooperation and WHO

This study tests the applicability of recently developed immunodiagnostic methods in the laboratory for diagnosis of *Entamoeba* infection and for differentiating pathogenic from nonpathogenic *E. histolytica* infection by testing stool specimens from patients infected with each. Stool microscopy and culture for *Entamoeba* infection,

isoenzyme analysis of cultured amoeba, and immunoassay methods were followed. Stool samples from both diarrhoeal and nondiarrhoeal subjects were used.

Evaluation was extended to the commercially produced *Entamoeba* ELISA kits (which detect both *E. histolytica* and *E. dispar*) and *E. histolytica* ELISA kits (which specifically detect *E. histolytica*) to more than 2,000 subjects with and without diarrhoea.

Sensitivity and specificity of the *Entamoeba* ELISA compared to the culture were 94% in both cases. Sensitivity and specificity of the *E. histolytica* ELISA compared to the culture were 86% and 98%, respectively.

We found that microscopy is neither a sensitive nor a specific test for diagnosis of *Entamoeba* infection. The *E. histolytica* ELISA is the first commercially produced kit that can differentiate between the disease-causing species of *E. histolytica* and the morphologically identical nonpathogenic species *E. dispar* directly from stool samples within two hours.

The ELISA tests need to be adapted to a user-friendly format, such as a dipstick, and can be used for routine diagnosis of amoebic infection.

#### Field evaluation and further characterization of a pathogenic-specific monoclonal antibody against *E. histolytica*

PI: R. Haque

CI: D. Warhurst (London School of Hygiene & Tropical Medicine)

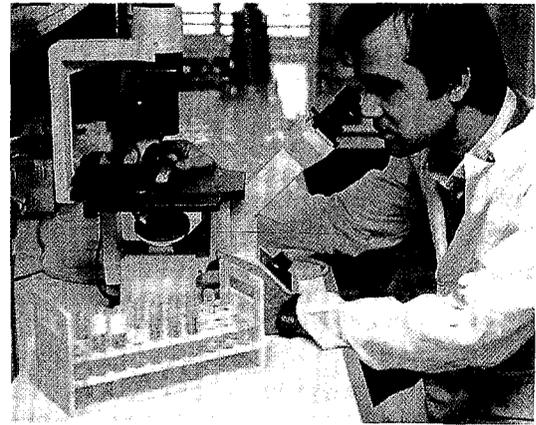
Funded by: The European Union

Culture for *Entamoeba*, isoenzyme analysis of cultured isolates of *Entamoeba*, and polymerase chain reaction (PCR) were performed on stool samples of patients infected with *Entamoeba*.

Progress has been made in establishing a polymerase chain reaction solution hybridization enzyme-linked immunoassay (PCRSHELÁ) for the differential diagnosis of *E. histolytica* and *E. dispar*.

Twenty-five cultured isolates of *Entamoeba* have been speciated, using this newly developed technique, into *E. histolytica* and *E. dispar*. Adaption of this technique for use with stool samples from patients is currently being attempted.

The present study will be helpful in investigating the molecular epidemiology of *Entamoeba* infection as well as the use of PCR assay as a diagnostic test for *Entamoeba* infection.



The Parasitology Laboratory continues work to develop ELISA tests to distinguish pathogenic and non-pathogenic *Entamoeba histolytica*

#### Biochemistry and Nutrition Laboratory

Head: M.A. Wahed

#### Subclinical vitamin A deficiency among infants in Bangladesh

PIs: M.A. Wahed, J.O. Alvarez, M. Hussain and F. Jahan

Funded by: USAID

In Bangladesh, the high prevalence of clinically evident vitamin A deficiency in under-5 children has been well documented. Little is known, however, about the vitamin A status of infants. The relative-dose response (RDR) test was carried out in 85 apparently healthy infants ( $5.9 \pm 2.3$  mo) coming for routine immunization to the ICDDR,B hospital in Dhaka and to the Dhaka Shishu Hospital. The mean serum vitamin A [R] was  $0.66 \pm 0.3$   $\mu\text{mol/l}$  and the mean RDR was  $29.8 \pm 22.1$ .

Based on serum vitamin A level, 18% of the infants had  $<0.35$   $\mu\text{mol/l}$  which, according to WHO, would indicate a serious public health concern. About 60% of the infants were vitamin A-deficient either by the serum vitamin A level  $<0.70$   $\mu\text{mol/l}$  or RDR  $>20$ .

These children may never be able to correct their post-natal vitamin A status. Consequently, they remain at risk of developing vitamin A deficiency at a later stage.

A supplementation strategy using large doses of vitamin A or improved dietary sources should also be targeted at lactating mothers to improve the vitamin A content of breastmilk and thereby improve the liver stores of vitamin A in their offspring.

### Research support

○ Twenty-two research projects of the Centre received services from this Laboratory. A total of 11,658 special tests were conducted.

○ Vitamin A and zinc were assayed on 385 serum samples from the Nutrition Unit, Instituto de Medicina Tropical Principe Leopoldo, Belgium (Ph.D. student's project).

○ Zinc estimation was done on 34 breastmilk samples from Dhaka Shishu Hospital (project funded by the Bangladesh Medical Research Council).

○ Serum vitamin A was assayed on 40 samples from the Bangladesh Institute of Herbal Medicine, Nutrition and Social Development.

### Developments and Improvements:

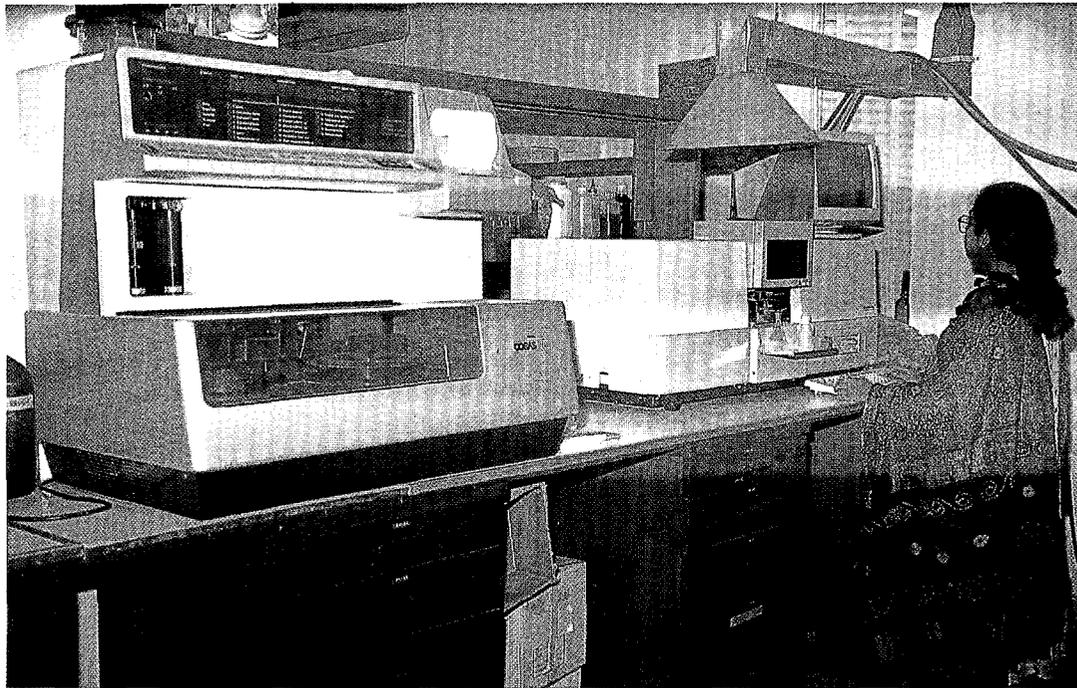
Several new tests were developed: (1) Acid glycoprotein, (2) Betamacroglobulin, (3) Retinol in breastmilk and urine, and (4) Betacarotene in diet, using High Performance Liquid Chromatography (HPLC).

Costs of laboratory tests have been revised, resulting in cost reductions for most of the tests.

○ Participation has been continuing in the quality assurance programme run by the National Institute of Standards and Technology, USA. Performance in analyzing vitamin A was rated very good.

○ Collaboration with the University of Alabama at Birmingham has been proceeding well. Dr. J.O. Alvarez of UAB visited the Centre in June to formalize several programmes: (1) A Ph.D. student's project, "Vitamin A loss in urine in acute infection" was started, and lab analyses are being performed, (2) A pilot study, "The effect of recurrent infections on vitamin A status in children with adequate vitamin A stores" was started, and laboratory analyses are pending.

○ Collaboration is ongoing with the Johns Hopkins University to support a Ph.D. student's project "Effect of retinol and Bcarotene supplementation in lactating mothers on breastmilk quality and vitamin A status in infants." Sample collection was completed and about 500 milk samples were analyzed for vitamin A.



*In the Biochemistry and Nutrition Laboratory a research assistant works with an Atomic Absorption Spectro-photometer to measure trace elements in blood*

Analysis of serum samples for vitamin A1 and A2 is pending.

### Department of Laboratory Services

Head: M. Rahman

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

It provides laboratory support to the clinical, community and field studies undertaken by the Centre scientists, and provides diagnostic laboratory services to patients attending the Clinical Research and Service Centre (CRSC) at Dhaka, the Matlab Diarrhoea Treatment Centre (DTC) and private patients, and also provides training to national and international fellows, graduate and postgraduate students in laboratory research and diagnostic procedures.

### Clinical Microbiology

PI: M. Rahman

The major accomplishment of the Clinical Microbiology Laboratory during 1995 was the adaptation of a new classification scheme for the detection of *Acinetobacter* spp. from clinical samples.

An analysis of microbiological data was performed to study different pathogens obtained during the past four years. Antimicrobial resistance, its pattern and changes among *Vibrio*, *Salmonella typhi*, *Shigella*, blood and urinary isolates were analyzed.

The mechanism of antimicrobial resistance was studied among multi-resistant *Salmonella* spp. and fluoroquinolone-resistant *E. coli*, *Acinetobacter* spp., *Proteus* spp., and *Pseudomonas* spp.

During 1995, this laboratory also supported 25 research protocols and collaborated with the University of Dhaka (Prof. Sirajul Islam Khan, Department of Microbiology and Prof. Shamima Nasrin, Department of Biochemistry) through research work on *Salmonella* and *Shigella* by graduate students.

Field support was also given to the Community Health Division's team of investigators to contain *V. cholerae* 01-associated diarrhoea (cholera) epidemics in different parts of the country.

A total of 94 (22%) of 432 rectal swabs collected by the Centre's epidemic control team were positive for *V. cholerae* 01 and 41 (9.5%) were positive for *V. cholerae* 0139. New protocols were also adapted for optimum

isolation and identification of new species/serotype of different bacterial pathogens.

The total workload and workload units per hour for 1995 were calculated to evaluate the performance and efficiency of the lab according to the procedure of the College of American Pathologists. Workload units were 52 minutes per man hour.

More than 41,914 clinical samples were tested by the Clinical Microbiology Laboratory during 1995.

### Surveillance and associated studies of antimicrobial resistance in *Streptococcus pneumoniae* (Sp) and *Haemophilus influenzae* (Hi) in children

PI: M. Rahman

Funded by: The Bangladesh Government  
and the World Bank

Several antimicrobial agents, such as co-trimoxazole, amoxycillin, and procaine penicillin are recommended by WHO for therapy of pneumonia because their spectrum of activity includes *S. pneumoniae* (sp) and *H. influenzae* (Hi), which are the principal bacterial pathogens that cause pneumonia. In Bangladesh, co-trimoxazole is the agent recommended by the National ARI Control Programme.

The recent emergence of resistance to antimicrobial agents in *S. pneumoniae* and *H. influenzae* infections 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 that this be incorporated into the National Programme.

The objectives of the proposed study are to develop WHO-recommended methods for surveillance for resistance in Bangladesh (providing important data to the national programme), and to evaluate simplified methods that could be applied in subsequent surveillance activities in Bangladesh and elsewhere.

In addition, the contribution of ARI control activities to overall antimicrobial use rates will be assessed and determination made whether this use is contributing to the development of resistance. Finally, studies will be done to evaluate sources of antimicrobials, and mothers' knowledge and attitudes and behaviour regarding antimicrobial use. These studies may provide information that would be helpful in decreasing total and inappropriate antimicrobial use, thus slowing the spread of resistance.

### Animal Resources Branch

Head: K.A. Al-Mahmud

During 1995, this branch provided support to the Centre scientists in performing animal experiments of 12 approved research protocols, five approved inter-departmental research activities, and several exploratory experiments. It produced the required number of research animals of different species and extended its veterinary services through the Small Animal Clinic. As per the Centre's policy, this year the branch also had inter-institutional collaboration with:

The Institute of Public Health (IPH);

The Institute of Post Graduate Medicine & Research (IPGMR);

The Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine & Metabolic Disorders (BIRDEM);

The Livestock Research Institute;

The University of Dhaka;

The Bangladesh Agricultural University; and with leading national and multinational pharmaceutical companies in Bangladesh.

During the year, the Branch provided training to a graduate veterinarian on laboratory animal management and supervision and to a laboratory animal technician. Mr. K.M. Nasirul Islam, Section Supervisor in the ARB, underwent training on genetic monitoring of laboratory rodents at the National Institutes of Health (NIH), Bethesda, MD, USA.

### Research and Treatment Section

Head: A.S.M. Hamidur Rahman

An improved animal model of shigellosis in the adult rabbit by colonic infection was developed. The model has proved to be superior to previous models, is less expensive, and does not require pretreatment or starvation of the animals. The model should be useful in the studies of the immunopathogenesis of *Shigella* infection.

Apart from the routine health monitoring of laboratory animals, the Section performed the following animal studies and experiments using different species of animals:

Immunological studies for the production of antisera against various antigens; ileal loop assay, RITARD model, live cholera vaccine study, absorption promotion study, physiological studies, infant rabbit assay, etc. were carried out using rabbits.

A sereny test, using infant mice, was performed on guinea pigs and heat stable toxin (ST) was tested.

### Small Animal Clinic

Head: M. Hossain, Veterinary Officer

In addition to treatment of research animals, the Small Animal Clinic extended its veterinary service by treating about 240 pets, mostly dogs, for general treatment, vaccination, surgical treatment and advice.

### Production and Nutrition Section

Head: K.M. Nasirul Islam

This section is primarily responsible for the breeding of research animals of different species and supplying healthy animals and animal blood to the scientists for animal experiments and media preparation for different laboratory tests.

### Histopathology Laboratory

Head: A.K. Azad

The histopathology laboratory supported four research protocols: two from CSD, one from LSD and one from the Department of Zoology, University of Dhaka. Monthly clinicopathologic conferences highlighting interesting autopsy findings were conducted at the Centre. Data are being analyzed from autopsy materials.

### Clinical Pathology Laboratory

Head: Md. A. Hossain

The activities of the Clinical Pathology Laboratory (CPL) include: 1) diagnostic support for patient care activities for the Clinical Research and Service Centre (CRSC), Staff Clinic, Travellers' Clinic and referred cases from national hospitals (paying users); 2) support to research protocols; 3) training of in-house staff, national and international fellows; and 4) conducting research.

CPL performed 132,802 tests on blood, serum, plasma, stool, urine, CSF, etc. The paying cases increased by more than 17%.

The most common parasites detected in stool samples were *Giardia lamblia*, *E. histolytica*, *E. nana*, *T. hominis*, and *Cryptosporidium* spp. Malarial parasites of both *P. vivax* and *P. falciparum* were present. In addition to routine blood tests, coagulation tests, blood grouping and crossmatching, and hepatitis B markers were also done. Among the major accomplishments was the purchase of a Microplate ELISA reader with printer to test for the full panel of hepatitis markers and some cancer markers.

**LSD** The Laboratory continued its participation in an inter-laboratory comparison programme in the Quality Assurance Scheme with the College of American Pathologists 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 Laboratory supported an international training course, "Laboratory Diagnosis of Common Diarrhoeal Agents," provided lab orientation to four SAARC fellows, trained two Vietnamese sponsored by WHO, trained comprehensive reproductive health clinic staff sponsored by the Asia Foundation, three staff from the Armed Forces Medical Institute of Bangladesh Government, and three Government fellows, placed in CRSC. The Laboratory supported 19 research protocols during the year. As a part of collaboration, one student from the Department of Zoology, University of Dhaka, worked in the parasitology unit for her M.Sc. thesis.

#### **Clinical Biochemistry Laboratory**

Head: A.K. Chowdhury

During 1995, the Clinical Biochemistry Laboratory rendered diagnostic support to patient care activities of the Clinical Research and Services Centre (CRSC), Staff Clinic, Travellers' Clinic and for referral cases from

national hospitals and private clinics (paying users). The Laboratory supports research protocols, trains in-house staff and national and international fellows, conducts research on methodological development, undertakes quality assurance programmes internally and externally, and provides technical support for the specimen reception area in collecting specimens/drawing blood. It also provides support for the Institute of Public Health (IPH), Dhaka.

During the year, the Laboratory performed 118,516 tests on blood, serum, plasma, stool, urine, cerebrospinal fluid, intravenous fluid, ORS, etc. The number of specimens from paying cases increased by over 18% compared to last year. The Laboratory continued its support to the IPH for the quality control of intravenous fluid for electrolytes, glucose and pH. Among the major accomplishments of 1995 was the purchase and installation of one Random Access Clinical Chemistry Autoanalyzer.

Twenty-four research protocols were supported during 1995. A total of 13 national and international fellows were provided training/orientation for periods ranging from one day to six weeks.

The Laboratory has continued to participate in the international External Quality Assessment Scheme (EQAS) conducted by the Queen Elizabeth Hospital,



*A senior technician identifies enteric pathogens and drug sensitivities in the Microbiology Laboratory*

Birmingham, U.K. The overall Mean Running Variance Index Scores (OMRVIS) of this laboratory varied between 42 and 82, which indicated a Grade 1 standard.

### Managerial and Technical Support

Head: M.A. Ali

The Managerial and Technical Support unit provides technical support activities and ensures the safety of the Centre. During the year, the Unit conducted a training programme on firefighting, housekeeping and safe disposal of biohazards, which was participated in by 65 technicians, laboratory attendants, and cleaners of the Centre. A training lecture on laboratory safety is now incorporated in a module of the international training course on "Laboratory Diagnosis of Common Diarrhoeal Disease Agents."

A new water supply system was installed for the supply of safe drinking water for the staff. A new ultracentrifuge machine and a fume-hood were installed.

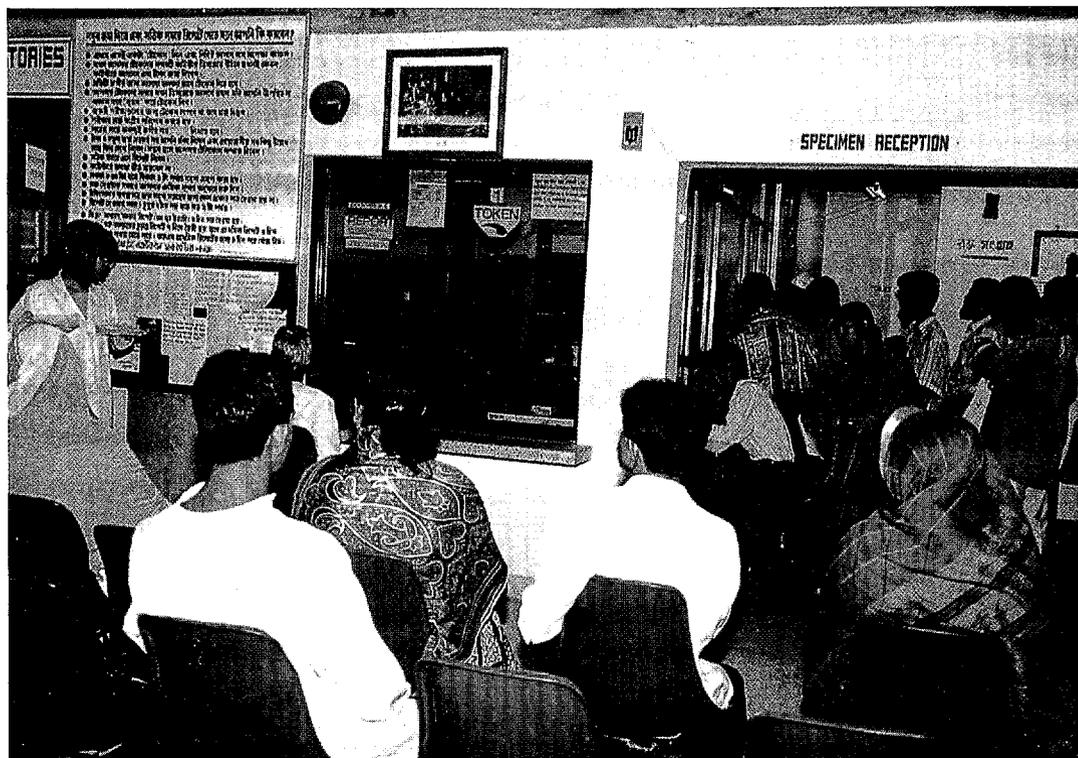
### Logistic Support Branch

Manager: Q.S. Ahmad

The Logistic Support Branch has two sections: the Media Preparation-Decontamination Section and the Bacterial Stock Culture Collection Section. During 1995, the Logistic Support Branch provided technical support to 41 research projects as well as to the clinical laboratories at Dhaka and Matlab. It supplied distilled water and various kinds of microbiological culture media for diagnostic and research purposes.

The Bacterial Stock Culture Section continued its routine activity by supporting nine research projects. This section has facilities to lyophilize various biological specimens as well as bacterial cultures. During the year, 2,500 bacterial strains of different serotypes were lyophilized.

In addition to routine work, considerable renovation work has been accomplished. The Branch provided collaborative support to the Institute of Public Health



*ICDDR,B's clinical laboratories provide an important, reliable service to the people of Bangladesh – and are a source of substantial income for the Centre*

(IPH) and the University of Dhaka by lyophilizing various specimens. It has also actively participated in the "International Training Course on Diarrhoeal Disease Agents" held at the Centre in 1995 by delivering lectures and supplying various culture media. Three technicians from the Asia Foundation in Dhaka received training in the media section on media preparation, autoclaving, and other techniques.

#### **Matlab Field Laboratory**

Manager: Q.S. Ahmad

The Matlab Field Laboratory provided diagnostic support to the Matlab Hospital Treatment Centre and different field-based research projects throughout 1995. The Laboratory performs tests on stool, blood, urine and other samples taken from patients. It is responsible for all diagnostic services at Matlab.

During 1995, the microbiology section performed 9,061 tests, which included culture and sensitivity of rectal swab, urine, blood, CSF, throat swab, etc. and darkfield examination for *V. cholerae*. About 1,200 bacterial pathogens were isolated, of which *V. cholerae* El Tor was the most predominant strain (34% of the total isolation). *S. dysenteriae* and *S. flexneri* were the other important pathogens isolated.

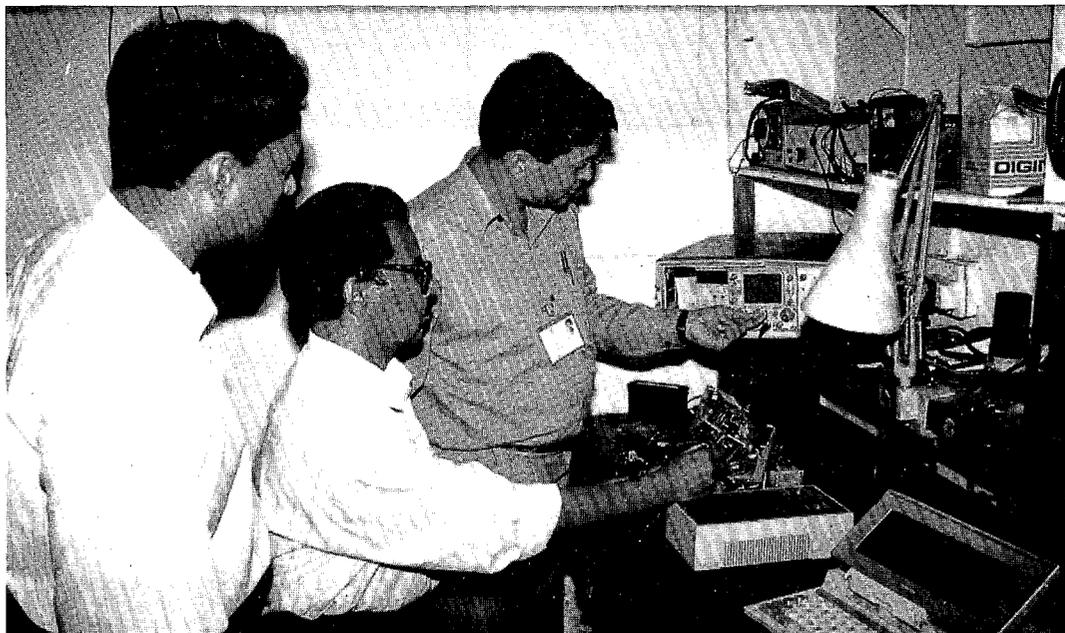
The Clinical Pathology and Hematology Section performed 13,152 individual tests. The routine tests include: routine examination of stool, urine, serum electrolytes, glucose, urea, TC DC, ESR, crossmatches, etc. The Environmental Section of Matlab Laboratory conducted by Dr. A.H. Bilqis was transferred to Dhaka. Henceforth all the environmental samples at Matlab will be tested by the Microbiology Laboratory personnel. A new Na+K+ analyzer (Beckman) was installed at Matlab. A technician has been extensively trained in the operation and maintenance of the new machine.

#### **Archives Unit**

Head: M.A. Malek

Using archived data for research purposes and for future reference for the scientists/researchers from home and abroad, the Archives Unit (LSD) serves as a databank for the Centre. For this purpose, the Unit provides routine support by computerising data for the treatment centres and laboratories (Dhaka and Matlab), performing data entry/verification, coding, editing, data cleaning and data processing.

The Unit produces monthly blood culture reports, *Shigella* sensitivity reports and financial recovery reports for the Clinical Laboratory, Treatment Centre,



*With the range and diversity of equipment in the Centre's laboratories the services of the BioEngineering Cell are in constant demand.*

**Data entry/verification  
and data processing status  
January – December 1995**

Name of Lab. forms	Dhaka (n=150,830)	Matlab (n=12,949)	Total (n=163,779)
Microbiology	44,511	4,693	49,204
Pathology (Stool)	25,113	2,437	27,550
Clinical Biochemistry	31,707	816	32,523
Pathology (Urine)	12,143	1,501	13,644
Hematology (Blood)	22,326	3,316	25,642
Serology	9,624	150	9,774
Miscellaneous	1,780	36	1,816
Media Preparation	3,626	x	3,626
<b>TOTAL</b>	<b>150,830</b>	<b>12,949</b>	<b>163,779</b>

Travellers' Clinic, Staff Clinic and private patients. It also provides support for producing monthly financial reports for media preparation.

It provides a weekly surveillance report (with graphical representation) for the Government of Bangladesh (GOB) on diarrhoeal pathogens isolated from the stool/rectal swab samples collected from the surveillance patients attending the Dhaka hospital. The Unit also provides support for data analysis, data management activities and research support to the Centre scientists and for different protocols.

To ensure better management and quick service, a database has been developed for the specimen reception area: to register and deliver reports for outside patients (paying cases); for day-to-day financial recovery reports; and for daily performance reports (numbers of tests, costs, etc.).

In 1995, the unit processed 163,779 records for Pathology, Microbiology, Clinical Biochemistry and others for the Dhaka and Matlab treatment centres (see table, facing page). This is an increase of 17.41% more than in 1994.

A database of 970,900 Pathology, Microbiology, and Biochemistry records has already been developed. About 14,000 records are added each month. A data-

base for specimens has been devised for easy retrieval.

During 1995, the Archives Unit developed a database for computerisation of specimen reception activities and delivery of reports for outside patients (paying cases) for better management and quick service; processed and produced monthly financial recovery reports; produced monthly *Shigella* sensitivity reports, blood culture reports, organism isolation reports and staff clinic reports; performed analyses for scientists/researchers for different ongoing protocols; supervised the coldroom activities; and provided 52 weekly surveillance reports for the GOB.

**Outpatient Service Project**

PI: M. Rahman

The Outpatient Service Project is involved in handling specimens from the Clinical Research and Services Centre (CRSC), Dhaka, Staff Clinic and paying users.

It provides all kinds of services to laboratory users, such as registration of patients and preparation of appropriate laboratory forms by the computers, drawing of blood from paying cases, cash handling and report delivery. The section handled 145,467 specimens and collected more than 18,324 blood samples in 1995.

**Bioengineering Cell**

Head: S.S. Huq

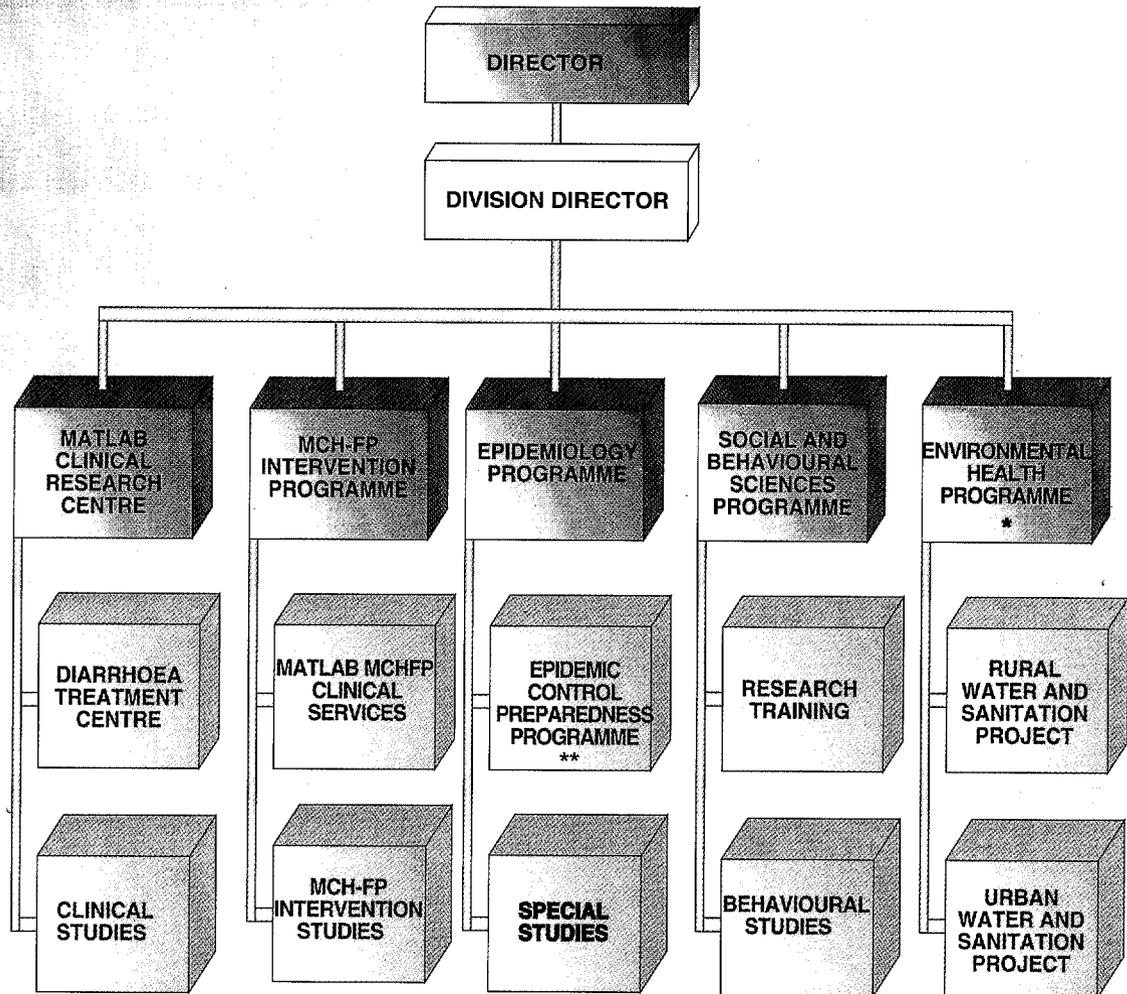
The Bioengineering Cell plays a vital role in installation, maintenance and repair of biomedical equipment for LSD and other divisions of the Centre.

The responsibilities include: installation of new equipment; routine maintenance of all the analytical clinical equipment; calibration of all the equipment to the desired level of performance; modification of equipment in case of nonavailability of spares or in the case of major breakdowns. The Cell attempts to manufacture its own laboratory spares/equipment with a view to avoiding total dependence on overseas imports.

The Cell successfully maintained new equipment and provided training for the operators. The overall performance of the Cell marked a significant growth in increased service recovery and low operating costs.

The Cell is assisting other institutions, such as the Institute of Postgraduate Medicine & Research (IPGMR) and the Institute of Public Health (IPH) to solve technical problems and is also providing training. ■

# COMMUNITY HEALTH DIVISION



\* Until late '95. Now under HPED

\*\* Until late '95. Now under HPED

## **CHD**

# **Community Health Division**

**Division Director  
J. Patrick Vaughan**

The Community Health Division focuses on reproductive and child health. It is the largest Division in the Centre, with a total of 400 employees and trainees in 1995. Research staff are particularly interested in studies of infectious diseases at the community level (especially diarrhoeal, acute respiratory and nutrition-related illnesses), and reproductive health. 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.

The Division has five scientific programmes, all of which interact in research, service, training, and administration.

### **Division Highlights**

- Professor J. Patrick Vaughan joined the Centre in late September as Division Director, on secondment from the London School of Hygiene and Tropical Medicine. Dr. Vaughan has done extensive work in Papua New Guinea and Tanzania and has been widely involved in epidemiological and public health related research.
- A maternal immunization trial with pneumococcal polysaccharide vaccine showed high levels of antibodies transferred to infants with a half-life of 35 days. This attracted considerable press and media attention. (Conducted with JHU and Harvard; funded by NIH).
- Clinical and population studies for reproductive tract infections (RTIs) were instituted. For this project a laboratory was established at Matlab, and field staff recruited and trained. Male clinics were initiated. (Conducted with LSHTM; funded by ODA, UK).
- The introduction of a geographic information system (GIS) in Matlab has broadened the investigative and intervention capabilities of the division. Production of maps, development of managerial techniques and the ability to demonstrate disease clustering, e.g. of watery diarrhoea, are now possible. (Funded by BADC and the Centre).

*Continued...*

## Priorities for Next Year

- **Pneumococcal vaccine-controlled trials:**  
Immunisation with conjugated vaccine of infants born to mothers given polysaccharide vaccine. (Conducted with Johns Hopkins; funding expected from the Thrasher Foundation).
- Phase two and three efficacy trials of pneumococcal conjugate vaccine in young infants. Preliminary proposal requested by WHO/CDC, Geneva. (With LSHTM; funding expected from USAID/NIH).
- Ecology and epidemiology of cholera in Bangladesh. Transmission to be studied in four sentinel districts that have shown different epidemiological patterns. (With Johns Hopkins; submitted to NIH).
- Strengthening Matlab's scientific capacity. Strategic planning of new scientific proposals for the clinical research centre and MCH/FP and DSS projects, involving greater integration, more rational use of resources and strengthening of Matlab management.
- Increasing capacity in epidemiology and health economics by:
  - (a) recruiting two international staff to vacant posts;
  - (b) further collaboration with other centres of excellence; and
  - (c) improved publication and dissemination of findings.

### Division Highlights

(Continued from previous page)

- Action research and impact assessments are being conducted with the Ministry of Local Government in Singair Thana (rural) and in three wards in Dhaka city, leading to community interventions for water, sanitation and hygiene education. Needs assessment and baseline studies have been completed. (Funded by Swiss Development Cooperation (SDC).
- The BRAC-ICDDR,B Matlab project continues measuring the impact of rural development on health status and human well-being. Baseline data has been completed. Quarterly surveys on nutrition, family income and status, and contraception have been carried out. (Funded by Ford Foundation, Aga Khan Foundation, and USAID).
- The Chakaria Community Health Project was initiated to promote self-help for health in a community of 60,000 people, with health education by village school volunteers and the strengthening of local self-help organisations. The project focuses on diarrhoea, water, sanitation and impregnated malaria bednets. (Funded by Swiss, Dutch and German Red Cross societies).

### Matlab Clinical Research Centre

Coordinator: Md. Yunus

The Matlab Clinical Research Centre is staffed by scientists and physicians whose primary involvement is in the Matlab Diarrhoea Treatment Centre (DTC) located 55 km southeast of Dhaka. The Matlab DTC and three other community-operated treatment centres (COTCs) provide free treatment services to diarrhoeal patients from Matlab and surrounding areas.

The Matlab DTC, with 70 beds, conducts clinical research, provides training on clinical management of diarrhoea and also provides support for many ongoing community-based studies, as well as demographic surveillance activities.

### Matlab Diarrhoea Treatment Centre

Head: Md. Yunus

Funded by: Core funds

During 1995, a total of 13,452 patients were treated at the Matlab DTC; 23% came from within the Demographic Surveillance System (DSS) area and 77% from outside (Table 1, below). The case fatality rate was 0.93%. Like the previous year *Vibrio cholerae* 01 predominated over *Vibrio cholerae* 0139.

Another 4,170 patients with diarrhoea were treated at the three community-operated treatment centres (COTCs), of whom 11 died – a case fatality rate of 0.26.

Stool specimens from 3,117 patients who were residents of the DSS area were cultured and yielded two main pathogens: *Shigella* spp. (12%) and *Vibrio cholerae* 01 (11%).

The isolation rate for the last eight years of both *Vibrio cholerae* 01 and *Vibrio cholerae* 0139 showed a decline during 1994 while isolation of *Shigella* spp. rose, the most common being *S. dysenteriae* type 1. The antimicrobial resistance patterns show continued sensitivity of all but *S. dysenteriae* type 1 to nalidixic acid (see charts, overleaf).

Stool microscopic examination was done on a total of 2,424 samples and the main ova and parasites detected were: *Ascaris lumbricoides* (21%), *Trichuris trichura* (10%), hookworm (3%), *Giardia lamblia* (3%) and *Entamoeba histolytica* (1%).

The Matlab Centre hosted 218 visitors during 1995 including representatives of donor agencies, visiting scientists and foreign diplomats.

**TABLE 1**

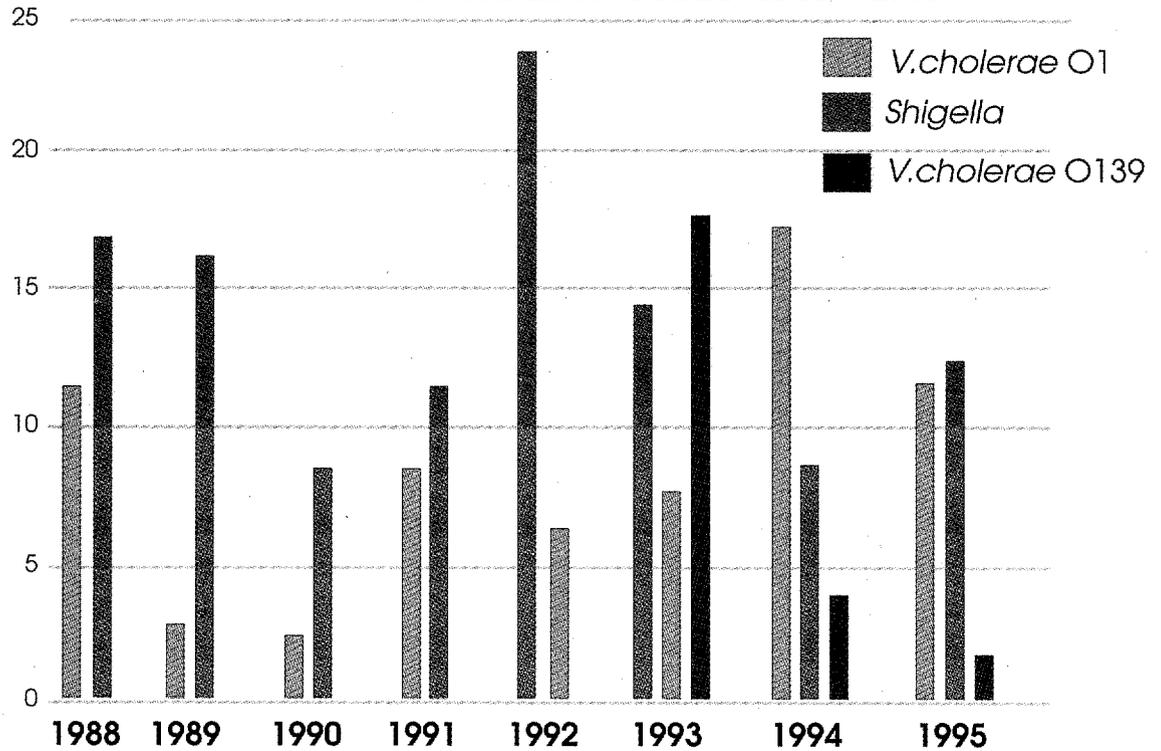
**Aetiological agents identified in patients from the Matlab DSS area\***

Matlab Diarrhoea Treatment Centre, 1995

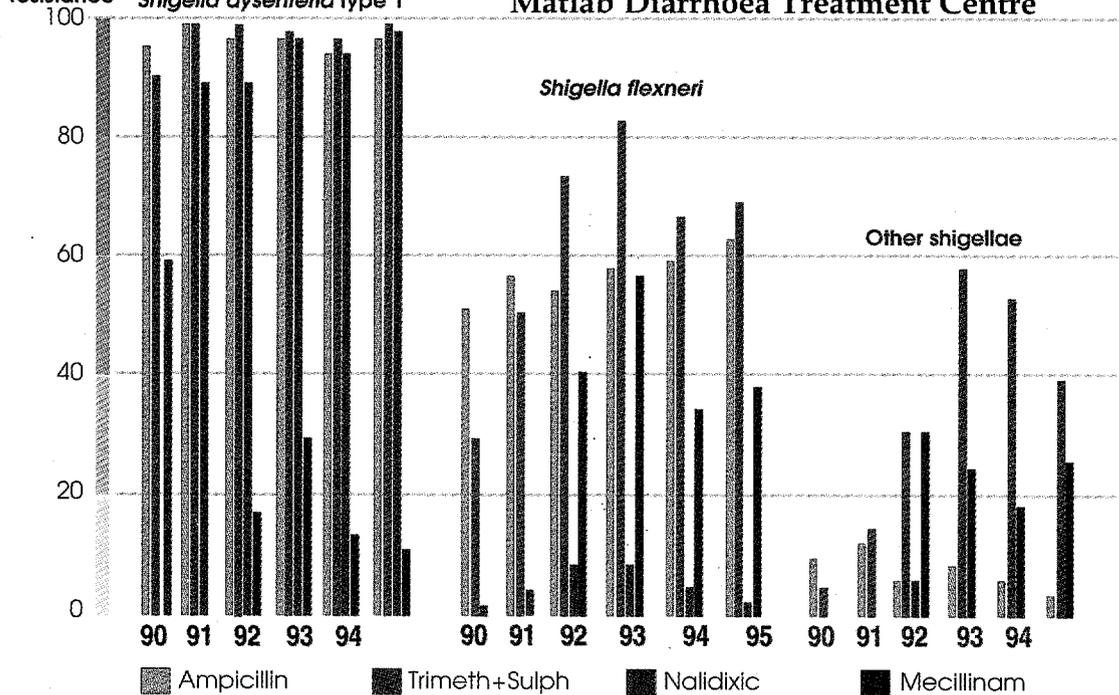
Month	Number of patients	DSS-area patients	<i>V.cholerae</i> 01	<i>V.cholerae</i> 0139	<i>Shigella</i>	<i>Salmonella</i>
January	824	196	6 (3)	0	9 (5)	0
February	360	103	4 (4)	0	10 (10)	0
March	818	260	10 (4)	1 (<1)	2 (1)	0
April	1,786	410	42 (10)	8 (2)	49 (12)	1 (<1)
May	1,806	315	39 (12)	6 (2)	41 (13)	2 (1)
June	1,257	263	21 (8)	4 (2)	44 (17)	2 (1)
July	1,259	346	28 (8)	4 (1)	49 (14)	0
August	1,182	318	42 (13)	4 (1)	30 (9)	0
September	1,379	314	48 (15)	1 (<1)	46 (15)	1 (<1)
October	1,066	231	57 (25)	2 (1)	29 (13)	0
November	964	201	35 (17)	0	46 (23)	0
December	751	160	20 (13)	13 (8)	25 (16)	0
TOTAL	13,452	3,117	352 (11)	43 (1)	380 (12)	6 (<1)

\*Figures in parentheses are percentages of DSS-area patients

**% of Isolation** **Isolation rate of vibrios and *Shigella* species**  
**Matlab Diarrhoea Treatment Centre 1988 - 1995**



**% of resistance** **Drug resistance patterns of *Shigella* species**  
**Matlab Diarrhoea Treatment Centre**



### **Matlab Staff Clinic**

Head: Md. Yunus

Funded by: Core funds

The Matlab Staff Clinic provides health care services to staff members and their entitled dependents. A total of 4,572 patients were seen as outpatients by the clinic and another 97 were hospitalized during the year.

### **Matlab Maternal and Child Health and Family Planning (MCH-FP) Programme**

PI: A. de Francisco

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

A variety of activities took place during 1995 under the umbrella of the MCH-FP Programme. Two international training courses on Family Planning (one for the SAARC Region and a second one for Asian countries) were organized and carried out. The field work of a large study on reproductive tract infections was initiated throughout the intervention area of Matlab in July. The establishment of male clinics for the management of reproductive tract infections and sexually transmitted diseases was initiated in August.

An intervention comparing the vitamin A supplementation to mothers after delivery (beta-carotene or retinol) was completed in 1995. A wheezing-associated respiratory disease control study was completed and analysis initiated. A 3-year follow-up of infants who were supplemented with 50,000 IU of retinol together with vaccines in infancy was conducted. Finally, a briefing file containing information related to the programme was developed and distributed.

## **PROGRAMME ACTIVITIES**

### **Family Planning**

PIs: A. de Francisco and J. Chakraborty

Funded by: The Government of Japan

The programme achieved a contraceptive users prevalence (CUP) of 68 percent, the highest ever reported in Matlab and approximately one-third higher than the national average, rising steadily over the year from 64.4% in January to 68.1% during December. The total fertility rate has been reported by the Demographic Surveillance System to be below 3.0% in the area.

By the end of 1995, a total of 12,500 women were contraceptive users, of whom 52% were using injectable contraceptives (DMPA) and 25% oral contraceptives, a proportion similar to last year. Current service-oriented research activities include the screening and treat-

ment for side effects of women using contraception. Initial management of side effects is carried out at the home by Community Health Workers (CHWs). However, CHWs refer patients to programme paramedics posted at the sub-centre if initial treatment is not sufficient.

Groups of women who wanted to have additional children tended predominantly to be non-users, whereas those who wished to have children later predominantly used temporary contraceptive methods. The CHWs are using this information to motivate clients to use contraceptives according to their reproductive needs.

Physicians of the programme carried out a total of 44 tubectomies during the year. Long-term observation for possible complications is being carried out by the programme through household visits. No vasectomies were performed during this period.

### **International Training Activities on Family Planning**

(See Page 106)

### **Reproductive Tract Infections in Matlab**

PIs: S. Hawkes, A. de Francisco, J. Chakraborty, R. Hayes and D. Mabey (LSHTM)

Funded by: ODA (UK)

This study, examining the prevalence of reproductive tract infections (RTIs), is now well under way in Matlab. It investigates the prevalence of RTIs - including sexually transmitted infections (STIs) - in population-based samples of men and women, syphilis in pregnant women, and ophthalmia neonatorum in newborn babies. All four studies are based on investigations conducted by the STI diagnostics laboratory established in Matlab.

A training programme on the syndromic management of RTIs/STIs has been carried out. These training courses will be run in Matlab again for collaborating institutions (specifically NGOs involved in reproductive health) in the coming year. The programme of supervision and training updates for staff in Matlab will continue over the next year.

In response to a perceived need for STI services, male clinics have been established in three of the four Matlab primary health care centres. The clinics are open to all men who suspect they have an STI or who are worried about other aspects of their reproductive health. In the coming year a fourth clinic will be opened.

**TABLE 2**

**Annual incidence rates of moderate and severe ALRI by age**

Matlab MCH-FP Programme (1991-92)

Age (months)	Mid-year Population	MODERATE AND SEVERE ALRI		SEVERE ALRI	
		Total episodes	Rate per 100	Total episodes	Rate per 100
4	354	89	25.1	35	9.9
5	449	169	37.6	46	10.2
6	445	139	31.2	34	7.6
7	582	132	22.7	36	6.2
8	514	114	22.2	25	4.9
9	438	100	22.8	24	5.4
10	364	102	28.0	24	6.6
11	341	116	34.0	28	8.2
12	310	116	37.4	29	9.4
13	341	169	49.6	39	11.4
14	364	133	36.5	28	7.7
15	447	130	29.1	31	6.9
16	343	98	28.6	27	7.9
17	455	100	21.9	19	4.2
18	516	84	16.3	15	2.9
19	615	74	12.0	16	2.6
20	601	66	10.9	14	2.3
21	464	71	15.3	11	2.3
22	399	65	16.3	8	2.0
23	319	55	17.2	9	2.8
24	292	28	9.4	7	2.4

**Community-based control of acute lower respiratory infections (ALRI) through case-finding, management and referral**

PIs: A. de Francisco and J. Chakraborty

Funded by: Core funds

ALRI is a major cause of death of 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

programme reported a significant reduction in ALRI-specific mortality (32%) after the intervention through the systematic detection and treatment by CHWs of pneumonia cases with cotrimoxazole.

During 1995 a thorough review of programmatic issues related to ALRI control was conducted. The programme submitted a proposal to WHO to be considered as a field site to test the new conjugated pneumococcal vaccine. The management and referral pattern of ALRI cases detected through a surveillance system was investigated for a period of 30 months in Matlab.

In total, 6,187 episodes (78% moderate, 22% severe) were reported. The annual incidence was 36.2% for infants and 13.7% for children aged 14. A further 35% of the episodes were repeat ones. A high proportion of all cases (86%) were detected at the home, with 71% being passive case detections at the CHW's home and 29% by active case detection by CHWs. Age-specific incidence rates are given in the table (facing page).

Self-referral (direct contact with a higher level of care) was recorded in 14% of cases, of which 47% were severe. A large number of severe cases rejected referral (262 actively and 520 passively detected). Children who died had a significantly longer mean period of contact between the onset of symptoms and contact with the health services than those who survived. Four years after the introduction of the ALRI control programme, about three-quarters of cases in this community were detected passively by relatives bringing their sick children to the CHW's home.

#### **Identifying the barriers to timely treatment for acute respiratory infections in infants and young children**

PIs: K. Zaman, S. Zeitlyn, J. Chakraborty and A. de Francisco

Funded by: International Development Research Centre (IDRC), Canada.

A total of 194 under-5 children suffering from acute lower respiratory infections (ALRI) in the Matlab MCH-FP area were prospectively followed. About 62% of the mothers sought allopathic treatment for their children within 24 hours of onset. No treatment was sought by 23%.

Most of the mothers could recognize the different symptoms of ALRI. Colds were reported as the most common cause of ALRI. No significant difference was observed in the reported symptoms or perceived cause of the disease between those who sought no treatment and those who sought allopathic, homeopathic, spiritual or combined treatments.

Failure to recognize severity and work loss were the most common reasons identified for not seeking any medical care. Whether a mother sought allopathic treatment or not was not associated with the child's age, sex, mother's age, mother's education, duration of illness, birth order, housing type or distance from the health centre.

The study indicates the potential value of giving parents clear guidelines on recognition of severity of symptoms of ALRI and motivating them to seek treat-

ment quickly when these symptoms appear. Health service providers should be aware of the heavy work loads that rural women have and the severe time constraints that deter them from seeking timely treatment from appropriate sources.

#### **Wheezing-associated respiratory disorders and hypoxemia in hospitalised children under five years of age**

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

Funded by: Swiss Development Cooperation (SDC)

Field work for this protocol ended in 1995. More than 300 children with ALRI who had been referred and admitted to the Matlab ALRI ward were recruited, as well as a similar number of controls (children admitted to the hospital for other purposes without a history of cough or tachypnoea).

The children were comprehensively examined and their relatives answered a questionnaire. Samples from nasopharyngeal aspirates (for viral and pneumococcal detection), as well as blood for serology were collected on admission. Pulse oximetry was taken at several intervals during admission and chest Xrays taken for all the children. Clinical and laboratory results will be correlated.

#### **The effect of retinol and $\beta$ -carotene supplementation in lactating women on breastmilk quality and vitamin A status in infants**

PIs: A. Rice, A. de Francisco, J. Chakraborty, M.A. Wahed, C. Kjolhede and R. Stoltzfus

Funded by: USAID

To assess the effect of vitamin A supplementation in lactating women on the subsequent vitamin A status of their infants, 220 women from the Matlab MCH-FP area were supplemented with either a one-time dose of 200,000 IU retinol, daily capsules containing 7,800  $\mu$ g beta-carotene or daily placebos, beginning at 2 weeks and continuing until nine months postpartum. Breastmilk and serum samples were collected every three months along with dietary assessment, anthropometric and morbidity data. The field work phase was completed in 1995 with laboratory and data analyses continuing into 1996. Effective strategies for improving the vitamin A status of very young infants are needed to help prevent vitamin A deficiency in preschool-age children. Maternal supplementation shows promise as one potential approach.

**CHD** **Three-year follow-up of children supplemented with 50,000 IU of retinol with vaccines during infancy**

PIs: A. de Francisco, J. van Dillen and J. Chakraborty

Funded by: Core funds

A cohort of children who were supplemented with three doses of either 50,000 IU (International Unit) of retinol (vitamin A) or placebo, together with vaccines, in infancy (see Annual Report '92) was followed up to three years of age. Information on morbidity through the first year of life and that of mortality during the first three years was collected. Additionally, 71 of these children were visited and the Denver Developmental Screening Test (DDST), adapted for Bangladesh, was performed to detect major developmental differences.

Initial results indicate that there are no significant differences between the developmental scores achieved by children who received vitamin A and those who received a placebo. No difference was noted either

between children who did or did not receive vitamin A supplementation as regards bulging of the fontanelle.

This may indicate that there are no significant major alterations on the developmental or neurological development of infants who received vitamin A with vaccines in infancy. Morbidity and mortality data are currently being analyzed.

**Safe motherhood in Matlab**

PIs: A. de Francisco, J. Chakraborty, A.M. Vanneste and Deborah Maine (School of Public Health, Columbia)

Funded by: Core funds

During 1995 a review of the safe motherhood activities was carried out. Information about maternity care interventions was further collected and reviewed in the light of additional findings. The study was conducted to evaluate factors other than the activities of the nurse-midwives in lowering maternal mortality, as reported by Fauveau from Matlab data in 1991.



*Work continues to examine the effects of vitamin A supplementation under the Expanded Programme on Immunization schedule on children's health status and development*

The indicators investigated included management of complications and referrals by the nurse-midwives, Matlab clinic staff and by the Government hospital staff in the regional hospital at Chandpur.

The decline in deaths depended heavily upon the functioning of the higher levels of the health system, specifically the hospital in Chandpur where comprehensive emergency obstetric services were available. These findings have implications for future work within the safe motherhood programme of the MCH-FP Programme in Matlab. The introduction of emergency obstetric services at the thana health complex in Matlab and the evaluation of the likely impact of this intervention on obstetric mortality can help clarify the issues of safe motherhood interventions in Bangladesh.

#### Nutrition Surveillance System

PIs: A. de Francisco and J. Chakraborty  
Funded by: Helen Keller International (HKI)

The MCH-FP Project is currently collaborating with Helen Keller International in a countrywide nutrition surveillance system in disaster-prone areas. Reports on anthropometric measurements – weight, height and midupper arm circumference (MUAC) – in groups of 500 infants, both in the treatment and comparison areas, are produced every three months for HKI.

#### Nutrition Rehabilitation in Matlab

PI: A. de Francisco and J. Chakraborty  
Funded by: Core funds

Measurement of mid-upper arm circumference (MUAC) is performed every three months on all under-5 children in the Matlab MC-HFP intervention area. If it falls between 120 and 110 mm, the child is closely monitored. If the MUAC is below 110 mm, the child is referred to the Nutritional Rehabilitation Unit (NRU) of the MCH-FP Programme in Matlab.

Recent analyses by the unit show that the children admitted are very severely malnourished. During the rehabilitation period children gain weight and MUAC but after discharge these children are still well below the parameters of children in the community (Height for age 2.58) (Weight for age 0.45) (Weight for height 0.11). Long-term followup is currently being conducted.

#### Health services -Mother and Child

PIs: A. de Francisco, J. Chakraborty and S.A. Khan  
Funded by: AusAID and Core funds

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

During 1995 a total of 2,552 deliveries were recorded. In 16% nurse-midwives were called and 3% were referred to the Matlab MCH-FP maternity care ward to be attended by programme physicians, with 2% being referred on to the Chandpur district hospital. The relation of risk-detection by nurses and CHWs is currently being examined. The outpatient department saw 18,158 women of reproductive age during the year, 58% for follow up of contraceptive methods, the largest group being users of injectable contraceptives.

A total of 909 under-5 children were admitted to the hospital during 1995, of whom 67% were suffering from severe ALRI and 5% from severe malnutrition. The outpatient department of the Matlab Hospital and the four subcentres attended infants and children 1 to 4 years of age, of whom a total of 312 were diagnosed and treated for dysentery during the year.

Immunisation data showed that 95% of infants are immunised with BCG, 75% with DPT III, 92% of children 9 to 23 months of age against measles and 98% of women of reproductive age with two doses of



*Acute Respiratory Infection (ARI) is now the number one killer of children in developing countries. Here, a helpful elder brother pours water on the baby's head to cool the fever.*

tetanus toxoid. In total, 12,426 children over six months of age were given vitamin A capsules, reaching a coverage of 97%. There were 1,005 ALRI cases reported during the year of which 78% were treated at home by CHWs, and 20% were referred to the ALRI Unit at the Matlab Hospital. During the year 227,075 locally made ORS packets and safe delivery kits were distributed in the area.

### Record Keeping System

PI: A. de Francisco, J. Chakraborty and G. Mustafa  
Funded by: Core funds

The Record Keeping System (RKS), the system which computerises all information derived from services of the MCH-FP Programme, was transferred in January 1995 from the Population and Family Planning Division to the Community Health Division under the MCH-FP programme umbrella.

This transfer (involving both administrative and scientific activities) triggered a whole new relationship between the programme and the data managers, with both the computerisation process and the data collection being reviewed to make the system more adaptable and dynamic.

New data entry and data cleaning strategies are being systematically introduced. As such, the utilisation of available data both for research and for service purposes can be expected to increase.

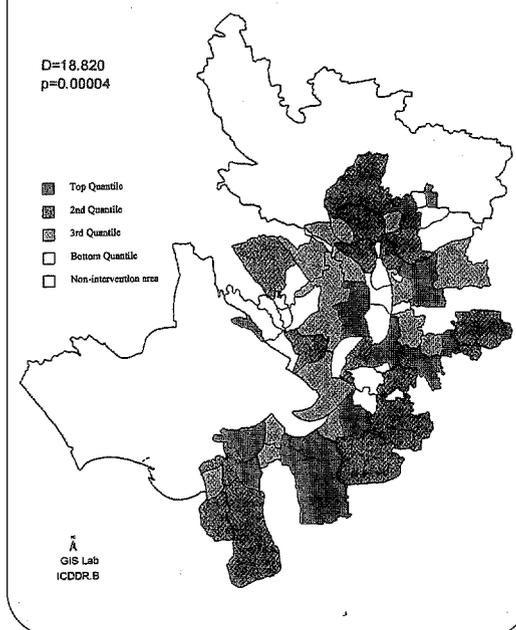
### Geographic Information System (GIS Lab)

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

Recently, the Community Health Division has broadened its area of investigation and intervention by introducing GIS technology. The system was first introduced into the Matlab study area with the aim of initiating studies based on spatial components and to make possible spatial analyses; to facilitate and monitor field work during data collection or service-provision; and to provide the investigators and field managers with a flexible tool for generating accurate maps and presenting their data.

Throughout the year the GIS team produced a series of routine maps of the Matlab area to assist investigators and field workers. The accuracy of the maps was tested on a sample of bars (households) using satellite information. The error on the location was found to be less than 100 meters, which is below the precision demanded by the device. Several statistical tests were

### Spatial Distribution of ARI Deaths in the MCH-FP Intervention Area, Matlab, 1989-92



also run to validate spatial patterns of some diseases. An in-house training session was organised on specific softwares. By acquiring digitised maps of Dhaka and Bangladesh, other health intervention areas were made available and will be explored by the system.

### Flood control programmes contribute to the improvement of health status in children in rural Bangladesh

PIs: J. Myaux, M. Ali, J. Chakraborty  
and A. de Francisco  
Funded by: BADC

The Demographic Surveillance System in Matlab was used to assess the effect of a flood control programme on the health status of under-5 children in the Matlab study area and to corroborate the benefits of the existing health interventions.

Specific adjusted mortality rates were analysed in four adjacent populations differing by their location either inside or outside a flood-control embankment and according to the type of health services provided. Between the period 1983-1986 and 1989-1992, overall

mortality in under-5 children decreased by almost 40%. Mortality rates outside the embankment were up to 29% higher in 1-4 year old children and 9% in all age groups. Deaths caused by severe malnutrition were noticeably higher outside the flood control programme. Simultaneously, health interventions contributed to a 40% reduction in under-5 mortality from all causes of deaths.

If there were adverse effects related to the presence of the embankment this study shows that they were largely compensated for by the benefits. However, mortality indicators need to be monitored over a longer period of time to assess the real impact of flood control programmes in Bangladesh.

**A preventive programme against accidental drowning could lead to further reduction of mortality in Matlab**

PIs: A. Iqbal, J. Chakraborty, J. Myaux, M. Ali and M. Hossain

Funded by: BADC

To examine the relative importance of drowning as a cause of mortality in children one to four years old, cases of death caused by accidental drowning were reviewed and compared to the overall mortality rate. The overall effect of the flood control programme since 1989 was also examined. Approximately 74% of the drowning deaths occurred in the 1-4 age group.

The proportion of deaths by drowning compared to total number of deaths went up from 7.5% in 1984 to 22.2% in 1994. In the areas protected from floods since 1989, when improvements were introduced, mortality due to accidental drowning dropped slightly ( $p=0.06$ ) when compared with the situation outside the embankment.

This paper highlights the importance of accidental drowning as an emerging priority for health programmers and indicates that further investigation will be needed to assess and develop specific interventions.

**Spatial autocorrelation test applied on cause-specific mortality rates in Matlab; how to validate visual impressions from maps**

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

Funded by: BADC

A spatial autocorrelation test developed elsewhere was used to analyse geographical variation of regional aggregated data from the Matlab study area. The demographic surveillance data for the period 1989-1992 was used, covering a cumulative population of

817,432 among whom there were 7,231 deaths. The rank adjacency D-statistic was used to summarize spatial autocorrelation on cause-specific death rates at the village level. The mean and variance were derived for D, including general weighting for adjacent pairs (1 if the villages are adjacent, 0 otherwise). Given the approximate Normal distribution of D, z-test is calculated for testing significance levels. GIS allowed the computing of adjacent village matrices and plotting choropleth maps on mortality rates. Cartographic representation of health-related data at the village level provides a quick and general overview of the health situation and will give the reader an objective measure to confirm or invalidate visual impressions.

**Anaemia during pregnancy in an urban community of Bangladesh: a study of prevalence, validation of simple methods and the impact of iron folic acid supplementation**

PIs: T. Juncker and A.M. Vanneste

Funded by: BADC

The aim of the study is to contribute to a more effective health policy formulation and implementation in anaemia control by estimating the prevalence and the severity of anaemia among pregnant women in Dhaka; testing the validity of two screening tests, the clinical test and an hemoglobinometer test; and studying possible negative effects of iron supplementation during pregnancy.

Preliminary results show that 39% of pregnant women have low Hb levels. Recent retrospective studies have indicated adverse effects of iron supplementation in non- or moderately anaemic pregnant women. In the present study, the negative effects of iron supplementation will be measured through a randomized double-blind community-based trial.

The possible outcome variables are intrauterine death, low birth weight, eclampsia, preeclampsia and maternal infection. The results could have important implications for national programmes where iron is provided to all pregnant women.

**Disease patterns, treatment practices and drug requirements in rural MCH-FP government facilities of Southwest Bangladesh**

PIs: H. Wirzba and T. Juncker

Funded by: BADC and USAID

The object of the study is to provide information on the disease and treatment patterns at Family Welfare Centres (FWCs) and Satellite Clinics (SCs) in selected

**CHD** areas of Bangladesh in order to estimate the drug requirements and to recommend a more rational use of drugs. Diarrhoeal diseases, skin problems, anaemia, intestinal parasites, gynecological problems and respiratory infections represent 67% of the diseases treated by the paramedics.

Infectious diseases are more frequent at the end of the rainy season and during the cold season. The fact that pathologies such as tuberculosis, leprosy or goiter are never suspected suggests that some serious symptoms are probably not recognized by the paramedics.

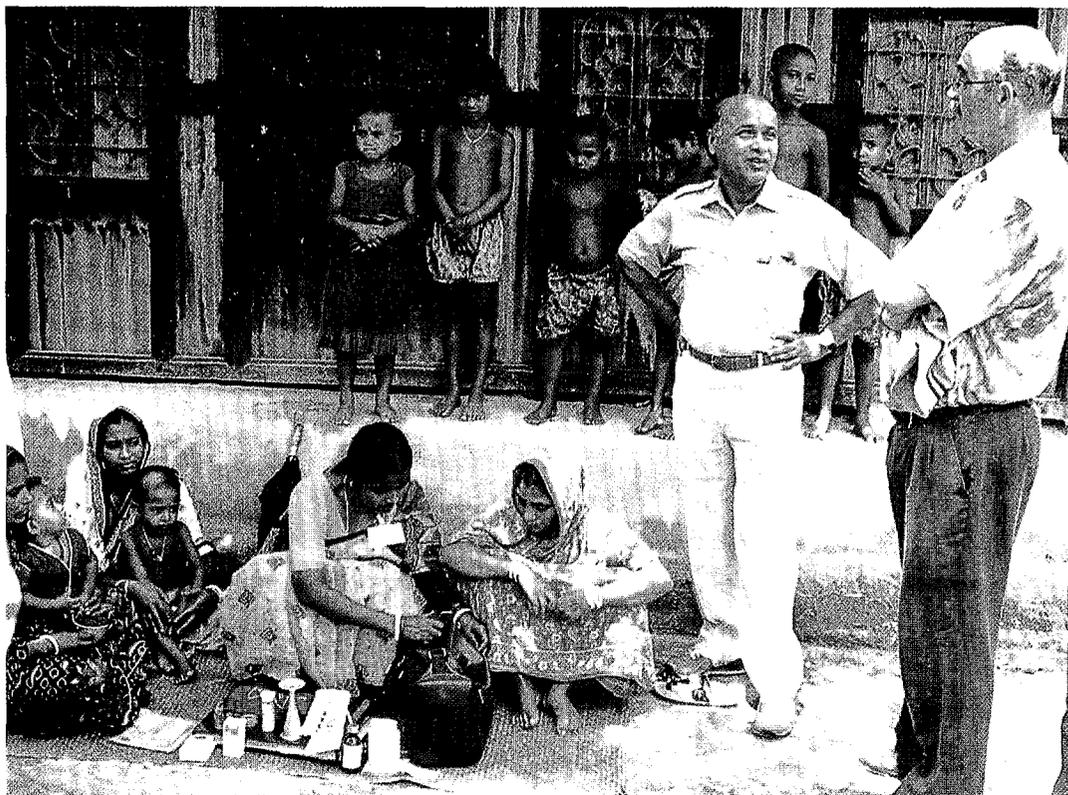
An exercise based on WHO methodology to estimate drug requirements was done to determine the types and quantities of drugs necessary for the clients included in the sample. This evaluation contributes to the establishment of an appropriate policy regarding drug requirements for Family Welfare Centres and Satellite Clinics in Bangladesh.

### Clientele and types of services at the Family Welfare Centres and Satellite Clinics in rural areas of Bangladesh

PI: T. Juncker

Funded by: BADC and USAID

This study provides information on types of services and clientele at the fixed and outreach MCH-FP centres in Abhoynagar thana. The majority of services (79%) provided at Family Welfare Centres (FWCs) and Satellite Clinics (SCs) is curative and child care. Antenatal, postnatal and FP services represent only 21% of the total. About one-quarter of the clients are seen at the satellite clinics. The majority of the clients are women and under-5 children – although some males also use these services. On the whole, the utilization of the services is low in all categories of clients. This evaluation contributes to determining staff and drug requirements for FWCs and SCs in Bangladesh.



*A Community Health Worker (CHW) lays out her medical supplies and equipment while Mr. J. Chakraborty, Manager, Matlab Health Services, explains the role and duties of a CHW to Mr. Albert Mehr, Charge D' Affaires, Embassy of Switzerland.*

**The gap between home and hospital:  
A qualitative study on the problem-solving process  
in obstetric complications**

PIs: T. Juncker and P.A. Khanum  
Funded by: BADC and USAID

Pregnancy remains a major health risk for women in many developing countries. Many deaths and much suffering could be prevented by timely referral to the hospital. The present study focuses on the health care seeking process in cases of obstetric complications, with reference to the sequence of events prior to admission to the hospital. The study also aims to assess the clients' satisfaction with hospital services.

Most of the patients sought help at home from several types of qualified or unqualified persons. Recourse to the hospital was seen by many as the last resort, after a delay ranging from a few hours to seven days, the decision being made by family or persons other than the woman herself, and cost of transport being an important factor.

It can be concluded that women rely very much on services provided by trained or untrained persons within their neighbourhood. Knowledge about signs of emergency requiring timely and adequate services is lacking in the community. Cost of services and staff behaviour are also important issues that influence the decisional process.

**The Family Welfare Assistant's alternative role  
in MCH**

PIs: T. Juncker and P.A. Khanum  
Funded by: BADC and USAID

A new intervention aimed at creating awareness about signs of obstetric complications among pregnant women was introduced in Abhoynagar, using FWAs and a new approach. Instead of performing verbal screening for detection of high-risk pregnancies as before, the FWAs inform the pregnant women about the signs of obstetric complications, motivating them to go to the hospital when such signs appear.

FWAs give the women a card depicting the symptoms of the major complications to enhance comprehension and convey the message to their decision makers. FWAs also issue an antenatal card and motivate their clients to go for checkups at the clinic.

After 12 months, FWAs' and pregnant women's attitudes, knowledge and practices were evaluated through qualitative and quantitative methods. FWAs have gained credibility in the community by giving

concrete services and the pictorial card is appreciated by both the providers and the clients. All pregnant women retained their home-based cards. Three-quarters understood the purpose of the pictorial card. Although comprehension of the illustrations on the card is related to the level of women's education, there has been a significant increase in antenatal checkups at the clinic level since the intervention was introduced.

**Epidemiology Programme and  
Epidemic Control Preparedness Programme (ECPP)**

Head: A.K.M. Siddique  
Funded by: The Norwegian Agency for  
Development Cooperation (NORAD)

**Cholera epidemics in 1995:**

In early 1995, epidemics of diarrhoea were reported from most of the southern and southwestern coastal districts. In May, following a tidal surge of low magnitude, suspected cholera epidemics were reported from Noakhali and Chittagong districts. During the post-monsoon period, eight northern districts were also affected by epidemics. A total of 529,381 diarrhoea cases and nearly 2,000 deaths were reported by the Government health services in 1995.

**Investigations and intervention by ECPP**

During the year ECPP, in collaboration with the national CDD programme, investigated reported epidemics of diarrhoea in 10 southern districts of Jhalokati, Barisal, Pirojpur, Bhola, Narail, Jessore, Khulna, Bagerhat, Noakhali and Chittagong. Investigations were also conducted in eight northern districts.

A total of 210,547 cases, resulting in 1,264, deaths, were reported from these districts by the government health services. The ECPP teams visited 63 thanas of these districts and, in collaboration with the local health staff, identified and treated a total of 2,328 acutely ill diarrhoea patients. These were clinically suspected cholera cases, the others being cases of dysentery.

The antibiotic sensitivity patterns studied by ECPP revealed that in all the districts *V. Cholerae* O1 and *V. cholerae* O139 are sensitive to the drug tetracycline, including the southern areas where the O1 strain was resistant to the drug.

*V. Cholerae* O1 strains, however, were completely resistant to cotrimoxazole. This has helped the health services to prescribe uniform drug therapy for treatment of cholera patients in Bangladesh.

**CHD** **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 are being longitudinally followed at Mirzapur, Tangail district, for a period of 24 months to determine the aetiologic agents of diarrhoeal diseases and the incidence and causes of acute lower respiratory tract infection (ALRI), particularly pneumonia.

A 500-bed general hospital (Kumudini Hospital) located close to the study villages collaborated in the study. All pneumonia and persistent diarrhoea patients were hospitalized for detailed investigation and proper management. The Laboratory Sciences Division of ICDDR,B provides support in the areas of microbiology, virology, and parasitology. Fresh stool microscopy is done at the Mirzapur field laboratory but samples for all microbiology and virology tests are sent to Dhaka daily. From September 1993 to October 1994, 288 newborn were registered from the ten selected study villages and each was given a unique identification number. On reaching 24 months of age, patients are excluded from the study.

**Maternal immunization with pneumococcal polysaccharide vaccine**

PIs: N.S. Shahid, M.C. Steinhoff (JHU), F. Qadri, S.S.

Hoque, R.B. Sack (JHU) and G.R. Siber (Harvard)

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

The objective of this collaborative study was to determine the antibody response of pregnant women to *S. pneumoniae* (Spn) and *N. meningitidis* (Nm) polysaccharide vaccines, and to determine the levels and proportions of each antibody isotype and IgG subtype, which are transferred to the newborn via the placenta and breastmilk.

Fifty-five mothers and 56 infants were followed from birth to five months of age. Women who received the Spn vaccine had geometric mean antibody increases of 2.6-3.4 to types 6B and 19F, respectively. The mean infant/maternal ratios were 0.56 and 0.59 (range 0.11-1.46) for these serotypes. Infant cord antibodies correlated with maternal titres. Infant/maternal IgG ratios correlated with the interval between immunization and delivery.

The median half-life of passive antibody was about 35 days. At five months of age 63-71% of infants of Spn vaccine recipients had antibody concentrations greater

than 0.15 µg/ml. The specific IgA antibody was 3 and 7 times higher in the colostrum of Spn-vaccinated mothers for serotype 6 and 19 respectively, when compared to Nm-vaccinated mothers.

Although type-specific antibody GMTs fell sharply, they remained at least three times higher in breastmilk among Spn recipients up to five months after delivery as compared to the breastmilk of mothers receiving the Nm vaccine. These findings indicate that maternal immunization with polysaccharide Spn vaccine may be a good preventive strategy against Spn disease in early infancy.

**Retinol and β-carotene content in breastmilk and the reflections of these levels in infants' sera**

PIs: N.S. Shahid, M.A. Wahed and A. Rice

Funded by: UNICEF

The objective of this study is to examine the relationship between mothers' breastmilk content of retinol and β-carotene and its reflection on their infants' serum levels. We examined breastmilk and sera for retinol and β-carotene content of 50 mother-and-child pairs collected for an earlier-mentioned study entitled "Maternal immunization with pneumococcal polysaccharide vaccine." Colostrum and breastmilk samples were collected up to 48 hours after birth, and after one, three and five months. Cord blood samples were collected at birth and at ages 6, 14 and 22 weeks. The current HPLC method was used for the laboratory assays.

Preliminary analysis shows that up to 17% of infants 0-5 months of age experience severe vitamin A deficiency ( $\leq 10\mu\text{g}/\text{dl}$ ) as reflected in their serum. Up to 70% in early infancy experience severe deficiency ( $\leq 20\mu\text{g}/\text{dl}$ ).

Retinol content of breastmilk was relatively higher and there was a positive correlation between intake of higher vitamin A content in mothers' and infant serum levels. Further analysis is in progress.

**Pneumococcal colonization of Bangladeshi infants**

PIs: N.S. Shahid and M.C. Steinhoff (JHU)

Funded by: USAID

Studies on nasopharyngeal colonization for pneumococci were initiated on a total of 57 infants followed longitudinally for 5 months. The median age of the first colonization was around 12 weeks (1,214 person weeks). Upto 80% infants were colonized up to 22 weeks of age.

The Danish standard system of serotyping was used to serotype the 138 pneumococcal strains isolated in this series. These findings have important policy implications for preventive strategies for the ARI programme.

## Social and Behavioural Sciences Programme

Head: J. L. Ross

The Centre continues to address the recommendations of the International Conference on Population and Development-Plan of Action (ICPD-POA). The Centre is committed to tackling reproductive and sexual health from a multidisciplinary, holistic perspective, with insights from the social and behavioural sciences being integrated with those from biomedical and demographic research. The Ford Foundation has provided support, with the aim of establishing a strong social science research capacity at the Centre.

### MAJOR ACTIVITIES DURING 1995:

#### Human Resource/Skill Development

A key to developing and strengthening the social and behavioural sciences at the Centre is human resource development. To address this need, training was undertaken with a series of seminars and exercises on non-survey, qualitative methodology; subsequently, training in quantitative methods was initiated. SBS staff now command what may be characterized as an "essential tool kit," as described below.

#### Integrated Qualitative and Quantitative Research Methods: the "Essential Tool Kit"

General qualitative techniques included training in participant observation, key informant (in-depth) interviewing, life histories, case studies of illness episodes, and participatory methods for social mapping.

Structured analysis of cultural domains were analysed using free-listing of cultural contents (e.g. illness), pile sorting, rating and rank ordering (e.g. severity, contagion), multi-dimensional scaling, and cluster and network analysis.

Training included the use of computer software tools such as ANTHROPAC, UCINET, GOFER and FOLIOVIEWS. Use of quantitative methods included surveys, sampling designs, SPSS, Systat, and Sygraph.

Human resource and skill development were greatly facilitated by 125 days of technical assistance by Dr. Pertti Pelto, Professor Emeritus of Anthropology at the University of Connecticut.

In addition, Dr. Pelto and Dr. Stephen Borgatti, of the University of South Carolina, offered a 10-day methodology workshop in May 1995 that introduced scientists to qualitative and quantitative analysis, including the use of ANTHROPAC and UCINET, a technique of network analysis, which has important applications in the social and behavioural sciences.

This was the first time this workshop has been available outside the United States. Drs. Pelto and Sandra Laston and SBS staff also provided a week-long qualitative methods training workshop for the staff of the Aga Khan Foundation's Dhaka Urban Community Health Programme.

#### Research

A principal strategy in training is to have staff "learn by doing." Research staff undertook a number of discrete exercises such as conducting in-depth interviews with key informants, conducting focus group or participatory exercises, and undertaking free-list and pile-sort exercises.

These exercises were integral to existing protocols, e.g. BRAC/Matlab, MCH-FP, and related to research priorities identified with those initiatives, e.g. women's empowerment.

#### Women's health priorities: cultural perspectives on illnesses, vocabulary and health-seeking behaviour in a rural area

PIs: J. L. Ross, K. Nahar, L. Muna, P. Nahar,

T. Hafiz, P. Pelto and S. Laston

Funded by: The Ford Foundation

The objective of this study is to identify the vocabulary of salient illness categories, and perceptions of the severity of illnesses among women in a rural Bangladesh community. Qualitative data were gathered using the techniques of free-listing, pile-sorting, and rating with samples of women in a village in the "comparison area" on the Dhonagoda River, approximately 40 minutes from Matlab Bazaar.

In-depth interviews were also used to collect examples of illness episodes, and to explore explanations of illness causation. Data-gathering took place from November 1994 to September 1995. Sample sizes in the various operations range from 50 women (the free-listing) to approximately 20 individuals for in-depth interviewing, pile-sorting, and other ethnographic data-gathering.

The results of the analysis indicate that women's reproductive tract illnesses are among the more salient and more serious health problems for which they seek health care. The pile-sorting data demonstrate that women in this rural community have clear concepts of illness groups and categories, with different concepts of treatment for the various categories.

These preliminary results from analysis of women's explanatory models of illness suggest that new initia-

tives concerning women's reproductive health are needed in this rural region.

**Men's health priorities:  
cultural perspectives on illnesses, vocabulary  
and health-seeking behaviour in a rural area**

PIs: J. L. Ross, G. N. Faisal, V. Gomes, H. Rahman,

P. Pelto and S. Laston

Funded by: The Ford Foundation

The objective of this study is to identify the vocabulary of salient illness categories and perceptions about the severity of illnesses among men in a rural Bangladesh community. Qualitative data were gathered as above and in-depth interviews were also used to collect examples of illness episodes and to explore explanations of illness causation.

The results of this preliminary analysis indicate that men's concepts of illnesses include explanatory models of sexually transmitted pathologies, as well as a large inventory of other illnesses that appear to have serious consequences for male economic productivity in the region. These preliminary results from analysis of men's explanatory models of illness suggest that new initiatives concerning men's health resources are needed in the Matlab area.

**Explanatory models of RTIs and STDs among  
men and women in rural Bangladesh**

PIs: J. L. Ross, L. Muna, K. Nahar, P. Nahar, P.

Pelto and S. Laston

Funded by: The Ford Foundation

The objective of this study is to generate preliminary versions of the cultural perceptions (explanatory models) concerning reproductive tract infections and sexually transmitted illnesses in the rural Matlab area. Data were gathered through in-depth key informant interviewing, as well as free-listing, pile-sorting, and other structured interviews from samples of males and females at several locations along the Dhonagoda River above Matlab Bazaar. Case reports of presumed STDs, as well as vocabularies concerning the varieties of symptoms and illness categories were collected. Sample sizes for the various data-gathering operations ranged from 75 males and females (free-listing) to samples of 20 to 25 individuals in various other in-depth and structured interview operations.

The results of this preliminary research show that people of the region recognize the importance of sexual transmission of illness. The data also show that there is considerable concern about "sexual illnesses," partic-

ularly among young men. Males go to a variety of indigenous and cosmopolitan (modern) health providers for treatment of symptoms affecting the genital area. These preliminary results point to a need for developing health care services that could also be important in reducing the spread of HIV infections in the rural Matlab region.

**Choices of health-care seeking in a rural  
community: pluralistic mixing of indigenous  
and cosmopolitan health resources**

PIs: J. L. Ross, P. Nahar, V. Gomes, H. Rahman,

G. N. Faisal, P. Pelto and S.L. Laston

Funded by: The Ford Foundation

The objective of this study is to construct a preliminary matrix showing peoples' preferences for specific health



*The socio-cultural obstacles to women seeking health care compound the topographical ones. The Centre continues its work to look at ways of overcoming these barriers*

providers and resources in relation to some of the more salient illnesses in the rural population of the Matlab region.

Data for this study were collected using a matrix format after extensive lists of illnesses and providers had been gathered in a community in the "comparison area" along the Dhonagoda River, less than an hour upstream from Matlab Bazaar. In-depth interviews were also used to collect data concerning the explanations of peoples' choices of health care providers. The sample for the structured matrix interviewing was 25 women from the research village.

The results demonstrate that a large share of health-care seeking is sought at the medicine shops and from the practitioners in a nearby rural bazaar, as well as at the somewhat larger selection of medicine shops and practitioners in Matlab Bazaar.

The practitioners in those locations include MBBS (cosmopolitan) doctors, homeopaths, and several others. Certain illnesses, notably "jauntis," are referred to local indigenous healers (kobiraj) who specialize in their treatment. These results indicate that health care initiatives in Matlab should take into account the complex mix of indigenous and cosmopolitan health resources that rural people use.

#### **Women and health: exploring the socio-cultural barriers and determinants of women's health status in rural Bangladesh**

PIs: S. Laston and K.M.A. Aziz

Funded by: The International Development Research Centre (IDRC), Canada

The aim of this study is to understand the socio-cultural determinants of women's health status in the comparison area of Matlab through the use of qualitative and quantitative methods. The special focus of this research is on pregnant women, husbands of pregnant women, traditional birth attendants, school teachers, traditional and biomedical practitioners, adolescent girls and elderly women, to identify barriers and potential agents of change in health care seeking behaviour.

The initial stage involved participant observation in six study villages (inside and outside the embankment) in the comparison area of Matlab. Later activities included key informant interviews with women, and local leaders, practitioners and birth attendants. The women were asked to describe health problems, health-seeking behaviour, and reasons for not seeking health care during illness episodes during the antenatal and postnatal period.

Case studies were conducted with adolescent girls and elderly women to understand their health problems and barriers to health care-seeking during the life span of village women. This integrated study of women's health provided a broader base of information and a better understanding of perceptions related to the health of women, as well as barriers and access to women's health care in this rural area.

#### **Initiation of HIV-related research and service activities at ICDDR,B**

PIs: J.L. Ross and S.N.M. Chowdhury

Funded by: The Ford Foundation

The Centre's response to the emerging problem of HIV/AIDS in Bangladesh was initiated in 1993. With funding support from the Ford Foundation, the Centre undertook initiatives in research and service activities, under the auspices of the Social and Behavioural Sciences Programme.

Key objectives included: biomedical, behavioural and operations research in reproductive and sexual health for purposes of developing policies and programmes; advocacy on HIV/AIDS and related issues; collaboration with, and providing technical assistance to, NGOs; staff education on HIV/AIDS; and documentation and dissemination of HIV/AIDS-related information.

#### **Information dissemination activities during 1995**

##### **Social and Behavioural Science Workshops and Seminars**

(See Page 106)

##### **Asia-Pacific Regional Network on gender, sexuality and reproductive health and fora on the teaching of health and social science**

PI: S.N.M. Chowdhury

Funded by: The Ford Foundation

The aims of this project are to conduct a review of the current situation of gender sexuality and reproductive health in Bangladesh; to prepare a case study on the teaching of health and social science in Bangladesh; to undertake consultation meetings on the country report with social scientists, health scientists, and representatives of women's organizations; to share experiences in a regional consultation workshop; and to develop a plan of action for collaborative work among social scientists, health scientists, and representatives of the women's groups within participating countries in the Asia-Pacific region.

### **CHD** Country report on health, gender, sexuality

PIs: J.L. Ross, S.N.M. Chowdhury and T. Mirza  
Funded by: The Ford Foundation

This paper contains information collected through literature reviews, personal communication and a consultative workshop on the demographic and general health situation, gender disparity and factors influencing it, legislation and policies and their influence on women's rights and status, especially in relation to health and sexuality. It also examines the current situation of reproductive health care, the role of donors in the field of reproductive health, research work in the field of gender sexuality and reproductive health, and future research needs.

#### **Teaching of health and social sciences**

PI: S.M.N. Alam  
Funded by: The Ford Foundation

This study made an analytical review of the state of social science research and teaching in Bangladesh. An extensive review of the syllabi of both medical and general universities was made. It was found that the teaching of health and social sciences in Bangladesh is still in its infancy. The paper noted that in spite of the lack of formal training in health and social sciences, many social scientists are conducting some excellent research. Those who pursue research on health issues use a learning-by-doing strategy. In spite of various limitations, such research is progressing quite well. Prospects for career opportunities for social scientists in health look good for the near future.

#### **Implementation of nutrition strategy for promotion of $\beta$ -carotene rich foods as a source of vitamin A in children**

PI: K.M.A. Aziz  
Funded by: USAID and SDC

The objective of the study was to implement the nutrition education strategy that was developed in the first phase of this project, leading to improved preparation and increased consumption of pro-vitamin A rich vegetables and fruits by young children and their mothers.

One hundred and sixty households of very low socioeconomic status, each with a mother and an index child aged 6-59 months, were included from each of the designated intervention and control areas in Matlab. Data collection, completed by June 1995, was followed by data coding and entry. Blood sample analysis (serum retinol) was completed and food sample analysis ( $\beta$ -carotene) was undertaken.

A positive impact of the intervention was detected on children's and mothers' meals in a preliminary analysis of the data on the consumption of green vegetables at the end of one year compared to the baseline. Consumption of high  $\beta$ -carotene vegetables containing (>5000 carotene ug/100g) by mothers increased from 34% to 91%. The number of mothers having meals without vegetables decreased strikingly following the intervention. This change in food composition indicates an understanding by the mothers about the importance of vegetables in their meals.

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

PIs: A. Bhuiya and M. Chowdhury  
Funded by: The Aga Khan Foundation,  
Ford Foundation, and USAID

During 1995 small-scale quantitative and qualitative studies were analysed, seasonal surveys implemented, and demographic surveillance data linked to BRAC's programmatic information to compare demographic rates among BRAC members and non-members. By the end of 1995, around 3,600 households or 30 percent of the BRAC-eligible households had joined BRAC.

A total of Taka 5.4 million (US \$ 134,580) was disbursed as loans for income-generating activities, and 68 schools for children were established, together with an additional 28 schools for adolescents. The schools employ 96 village women as teachers. All BRAC members have been trained to initiate income-earning projects.

BRAC interventions do not yet show any impact on crude birth and death rates or infant and childhood mortality rates. Preliminary analysis of individual-level data indicated that the probability of under-5 mortality among children of BRAC members and BRAC non-members has also been somewhat similar. However, a longitudinal study of 75 under-5 children for twelve months in a village of ICDDR,B's comparison area showed that the mean weight for age of the children from BRAC 1-year-old member households was significantly higher than children from non-member households. The probability of live births among BRAC-member women was significantly lower than the BRAC non-members, implying that the BRAC members have started to postpone pregnancy. Acceptance of modern methods of family planning was also found to be higher among BRAC members than BRAC non-members, especially in the area without ICDDR,B's MCH-FP services.

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

Project Director: A. Bhuiya

Technical Advisor: P. Eppler

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

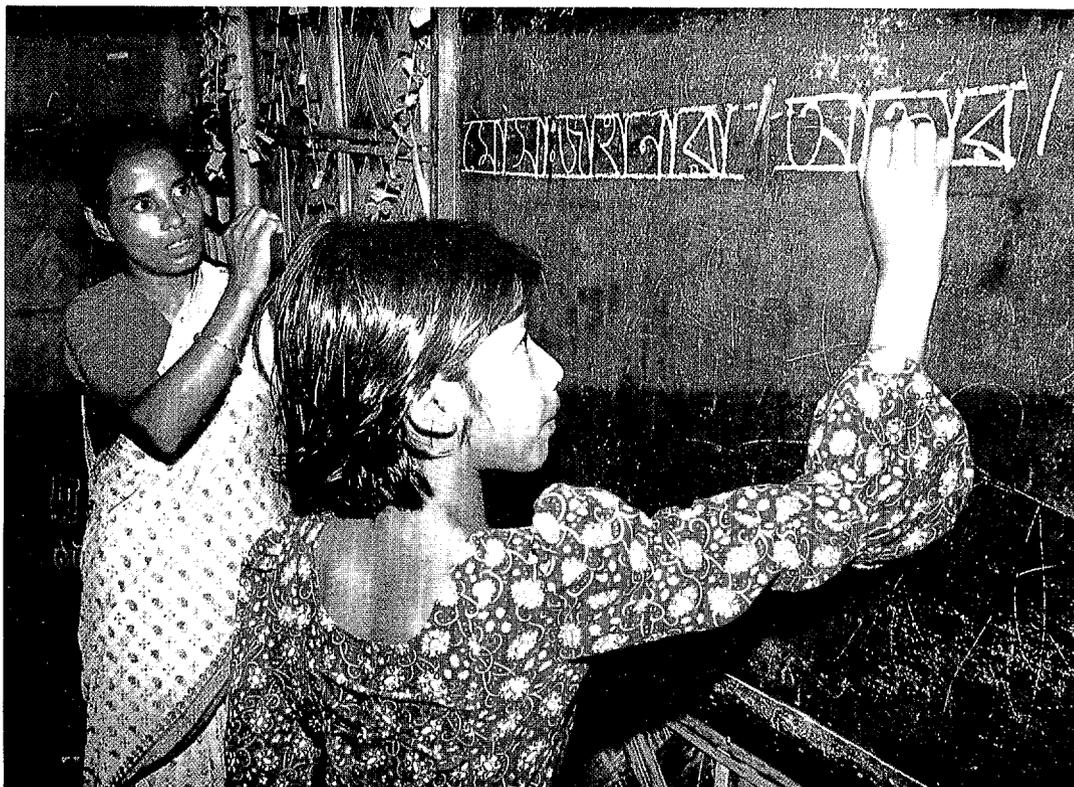
This was the second year of this project, aimed at the improvement of health through promotion of preventive measures and other relevant health initiatives by the traditional indigenous village-based self-help organizations (SHOs) in rural Bangladesh. The project started training male and female volunteers on diarrhoeal diseases, water and sanitation, and on local health care resources.

Five self-help village health posts were established. The project also provides training on growth monitor-

ing, nutrition-related counselling, pre-natal and post-natal checkups and technical assistance for management and resource mobilization. Mosquito nets impregnated with insecticides have been provided by the Government. All these self-help activities have taken place without material support from the project.

The baseline survey revealed that women and children in these disadvantaged households bore a heavy burden of diseases. Diarrhoea, respiratory illnesses and malnutrition were common in children. Most of the children were malnourished. Only 21% of eligible couples were using modern contraceptive methods. Immunisation coverage was lower than the national average. Deliveries were mainly attended by untrained birth attendants. Use of ORT was far from satisfactory. Non-allopathic practitioners were most frequently seen. For contraception, injectables were commonly used.

Also, knowledge about STDs and HIV transmission



*The BRAC-ICDDR,B collaborative programme in Matlab is examining the effect of BRAC's integrated Rural Development Programme, including girls' education, on health and development*

was very poor. In addition to the above, the vulnerability of the area to natural calamities, the endemic nature of malaria, the conservatism of the community and its remoteness has made the task of improving community health very challenging. Provision of more services without effective community mobilization and awareness-building is unlikely to achieve the desired goal.

### **Environmental Health Programme**

Programme Head: A.H. Bilqis

Health, development, and the environment are inseparably linked. Recognizing the importance of environmental health in the health and population context, 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 competent, multifaceted programme. The overall objective of the programme is to conduct and support environmental health research, mainly related to the control of diarrhoea and infectious diseases in both rural and urban areas.

### **Research**

EHP conducts both basic and action research. In addition, the programme extends technical assistance on request to government and non-governmental agencies. Several NGOs have been included as partners in EHP action research projects. This partnership is encouraged to develop local resources and to share the workload. It also frequently contributes towards the sustainability of project activities.

**Action research and impact studies on community water, sanitation and hygiene education interventions in rural areas** (approved by the Ministry of Local Government, Rural Development and Cooperatives)

Advisors: A.H. Bilqis, K.M.A Aziz, A.H. Baqui, R. Bairagi, D. Habte, A.U. Ahmed (DPHE), Zakir Hussain (DGPHC), R.B. Sack (JHU) and R.E. Black (JHU)

Funded by: Swiss Development Cooperation (SDC)

The goal of this project is to strengthen the national capacity to provide water supply and sanitation facilities for rural areas, with particular emphasis on behavioural changes in sanitation and hygiene practices.

The project is conducting action research on social mobilization, communication strategies, provision for water, sanitation, solid waste and hygiene (WSSH), development of appropriate technology and techniques, participation by schools, clinics and various community groups, government agencies, NGOs and private producers, gender aspects, policy and programmes, and cross-sectoral coordination.

The project is being implemented in Singair thana, Manikganj district, in collaboration with Concerned Women for Family Planning (CWFP) and PROSHIKA (national NGOs). Out of 11 unions in the thana, five have been randomly chosen for intervention and five for comparison.

A baseline survey of 3,200 households has been carried out, together with institutional surveys and focus group discussions. GOB and NGO worker surveys have been completed. Weekly diarrhoeal surveillance is being conducted on 2,000 randomly selected households. Water samples from handpumps, storage containers and surface water are routinely tested. Handwash samples are also tested.

Close links with the thana administration, elected local representatives and all NGOs have already been established. Seventy-four village water and sanitation (WATSAN) committees are working together to create awareness about safe water use, sanitation and hygiene. Publicity campaigns through posters, billboards, rallies, meetings, songs, essay competitions, etc. have been conducted. The findings of the project have been regularly shared with the National Task Force, the Ministry of Local Government, Rural Development and Cooperatives, DPHE, donor and UN agencies. The experiences gained have also been shared in international conferences. It is hoped that the project will not only have policy implications at the national level, but will also have global implications.

**Action research and impact studies on community water, sanitation and hygiene education interventions in urban areas**

(in collaboration with Dhaka City Corporation)

Advisors: A.H. Bilqis, A.H. Baqui, R. Bairagi, D. Habte, Q. Mahmood (DCC), M. Ashrafuddin (DCC), P. Winch (JHU) and R.E. Black (JHU)

Funded by: USAID

Despite the urban bias in sector investment, effective water and sanitation coverage in the urban areas is lower than in rural areas. The situation is further com-

pliated by the rapid urbanization and inequitable distribution of services and provisions. This largely results in depriving the urban poor of effective water and sanitation coverage. The Dhaka City Corporation (DCC) has requested EHP to provide assistance in conducting an action research project to address the WSSH problems.

The project is intended to improve the ability of GOB, NGOs and communities to achieve sustainable water, sanitation and hygiene education coverage and its related practices with a special focus on the urban poor. It is being implemented in Zones 3 and 8 of Dhaka city in collaboration with World Vision and PROSHIKA (national NGOs).

The rural action research model is being replicated with appropriate modifications. Samples from water sources and containers, together with handwashing samples, have been tested. Thirty-one moholla (neighbourhood) committees have been formed and links established with ward commissioners. Orientation meetings have been held in all neighbourhoods of the project area. With help from the project workers, the moholla committees took an active role in distributing water-purifying solutions during a flood in July 1995. Appropriate sewerage systems for a settled slum community are also being tested.

#### Technical assistance to UNICEF on home management of water and ingestion of polluted water in urban and rural areas in Bangladesh

Advisors: A.H. Bilqis, S.A. Ahmed,  
D. Mahalanabis and K.M.A. Aziz

Funded by: UNICEF

Investigation is needed to find out how water becomes contaminated in containers, the effect of container material on bacterial population in stored water, how to reduce contamination of stored water and how to make people understand, use and manage water safely for all domestic purposes. Forty-five rural and 45 urban slum women were observed in relation to the management and ingestion of water. The observation, conducted by trained female workers, was carried out between 6 am and 6 pm in March and April of 1995.

In rural areas, the bacteriological count of water at source was low (<5 fcu/100 ml), but high in samples collected from storage containers (>100 fcu/100 ml), within two hours of storage.

Data indicate that bacteriological count in water may increase with storage hours in rural households. This kind of association was not found in urban slums, but there was presence of residual chlorine in tap water.



*In low-lying areas, shacks that front on Dhaka streets back up to ponds where hanging latrines compound the environmental health problems*

The families in the study stored drinking water for approximately six hours. The inside bottom surface of water containers from rural areas was found to be heavily contaminated when scraped. Aluminum pitchers yielded markedly lower bacteriological counts than did earthen ones.

**Technical assistance to UNICEF:  
a study on handwashing practices in urban  
and rural areas of Bangladesh**

Advisors: A.H. Bilqis, S.A. Ahmed,  
D. Mahalanabis and A. Mahmud

Funded by: UNICEF

It is essential that the behavioural factors related to inadequate handwashing are properly understood in order to develop effective combating practices. EHP conducted a study to assess the efficiency of the current handwashing practices, and examined the relevance of correct sanitation messages for handwashing.

A two-month (April-May 1994) study was conducted in rural Matlab and urban Dhaka slums. One hundred families from each of two intervention communities were given education on improved handwashing practices. Two similar communities were selected for comparison, and no interventions introduced there. Prior to any intervention, the normal handwashing practices of the study population were recorded by interview and observational methods. The brief study indicated that the existing handwashing practices were not sufficient to remove bacterial contamination of hands, both hands proving to be highly contaminated (fcu/hand was more than 103), and that the acceptance of promoted components of handwashing varied by their perceived need. The study women reported the following constraints as barriers to handwashing: inadequate water supply (slum); unaffordability of preferred washing agent (rural and slum); and failure to take in all the education given on the components of effective handwashing practices (rural and slum). It is recommended that handwashing messages should clearly state the components of handwashing and target specific behaviour such as acts after defecation and before eating or feeding.

**Socio-environmental impact of the Meghna-Dhonagoda Irrigation Project**

Advisors: A.H. Bilqis, A.H. Baqui and  
R.B. Sack

Funded by: Asian Development Bank (ADB)

The Meghna-Dhonagoda Irrigation Project (MDIP) is a medium-scale flood control, drainage and irrigation project located in Matlab. The project covers an area of

17,584 hectares and forms an island surrounded by the Meghna and Dhonagoda rivers. After completion of the project, adverse social and environmental impacts of the projects were publicized.

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 and the data are now being analyzed. The findings of this study will have important implications for flood control projects.

The social and environmental impacts of embankments are extremely important for a riverine country such as Bangladesh, where floods are annual events and flood mitigation measures are necessary. However, such measures must be carefully balanced against social and environmental impacts.

**Water, sanitation, hygiene and health impacts of an integrated programme by GOB (DPHE) and UNICEF in Barisal**

Advisors: A.H. Bilqis, S.E. Arifeen, N. Shahid  
and R.B. Sack (JHU)

Funded by: UNICEF

During 1989-1991 the Department of Public Health Engineering (DPHE), in collaboration with UNICEF, undertook an integrated approach to sanitation improvement in three thanas of Barisal district, namely Gournadi, Banaripara and Agailjhara. In 1994, EHP was engaged by UNICEF to study the impacts of the project.

Data were collected from 2,690 families from the three thanas. Preliminary results show that more than 80% of the studied families claimed that they use some kind of sanitary latrine. However, the functioning of the latrines and hygiene practices of the people were found to be unsatisfactory.

**Diarrhoea prevention and management during flood**

Advisors: A.H. Bilqis and S.A. Ahmed  
Funded by: Norwegian Agency for International  
Development (NORAD)

Following the flood in July 1995, EHP conducted an observational study in flood-affected areas of Dhaka city to observe water- and sanitation-related practices among flood-affected people. Data analysis is in progress.

**Information Dissemination**

EHP also published 25,000 posters describing steps to be followed to prevent diarrhoea. The posters will be distributed to clinics, schools and other public places.

The posters will be also on display at the Centre's hospitals and outreach clinics.

### Environmental Laboratory

An environmental laboratory has been set up within EHP's new premises on the second floor of the library building. The laboratory has conducted tests on environmental samples from various sources for research projects and external agencies. New equipment such as an oven, incubator, precision balance, distillation plant, Kjeldahl digester, etc. have been procured. The laboratory will be expanding its range of tests in future.

### Global Applied Research Network (GARNET):

EHP coordinates a local networking forum, formed in 1991, following the guidelines of GARNET. Representatives from more than one hundred GOB, donor, UN and NGO agencies active in the field of environment attend the networking meetings. Two 2-day training courses were held for GARNET members on disaster preparedness. About 60 participants attended this UNICEF-funded programme.

### Health Systems Research (HSR)

#### Scientific Interest Group

Coordinator: M. Desmet

This Interest Group, conceived as an academic and not an administrative forum, was established in 1993. Its objectives are to enable an exchange of ideas and to discuss health systems research (HSR), to facilitate and stimulate the formulation and preparation of research protocols, and to provide support for junior researchers.

Activities comprise regular group meetings, seminar presentations by external speakers, and special arrangements for supporting junior researchers such as discussions on case studies. In 1995 the HSR Interest Group organized meetings on Safe Motherhood and EOC (Emergency Obstetric Care) in the Centre's MCH programmes, on EOC and Safe Motherhood in Matlab, and on Patient-load at the Matlab Diarrhoea Treatment Centre.

### 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, started in 1993, has an overall aim of providing a comprehensive analysis of the health care-seeking behaviour of the slum population, as a contribution to health policy. The specific objectives are to

identify components of health care decision-making and investigate the variables that contribute to health care choice-making.

The study consisted of three phases, including key informant interviews with slum residents and practitioners working in the slums, a 6-month longitudinal survey for morbidity episodes in 1,050 households through fortnightly visits, and case studies on specific health care-seeking behaviour.

### Health care use patterns of non-slum residents in Dhaka city

PIs: M. Desmet and M. Siddiqi (AKF)

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

Following the study on health care seeking in the slum population of Dhaka city (see above), a similar study was initiated in the non-slum population. Comparison of findings from both these 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 is in progress.

### Task force on the "Patient-load at the ICDDR,B Matlab Diarrhoea Treatment Centre"

Coordinators: Md Yunus and M. Desmet

This Task Force was formed to study possibilities for higher utilization of the ICDDR,B Matlab Diarrhoea Treatment Centre. Activities started in November 1994 with the identification of its Terms of Reference.

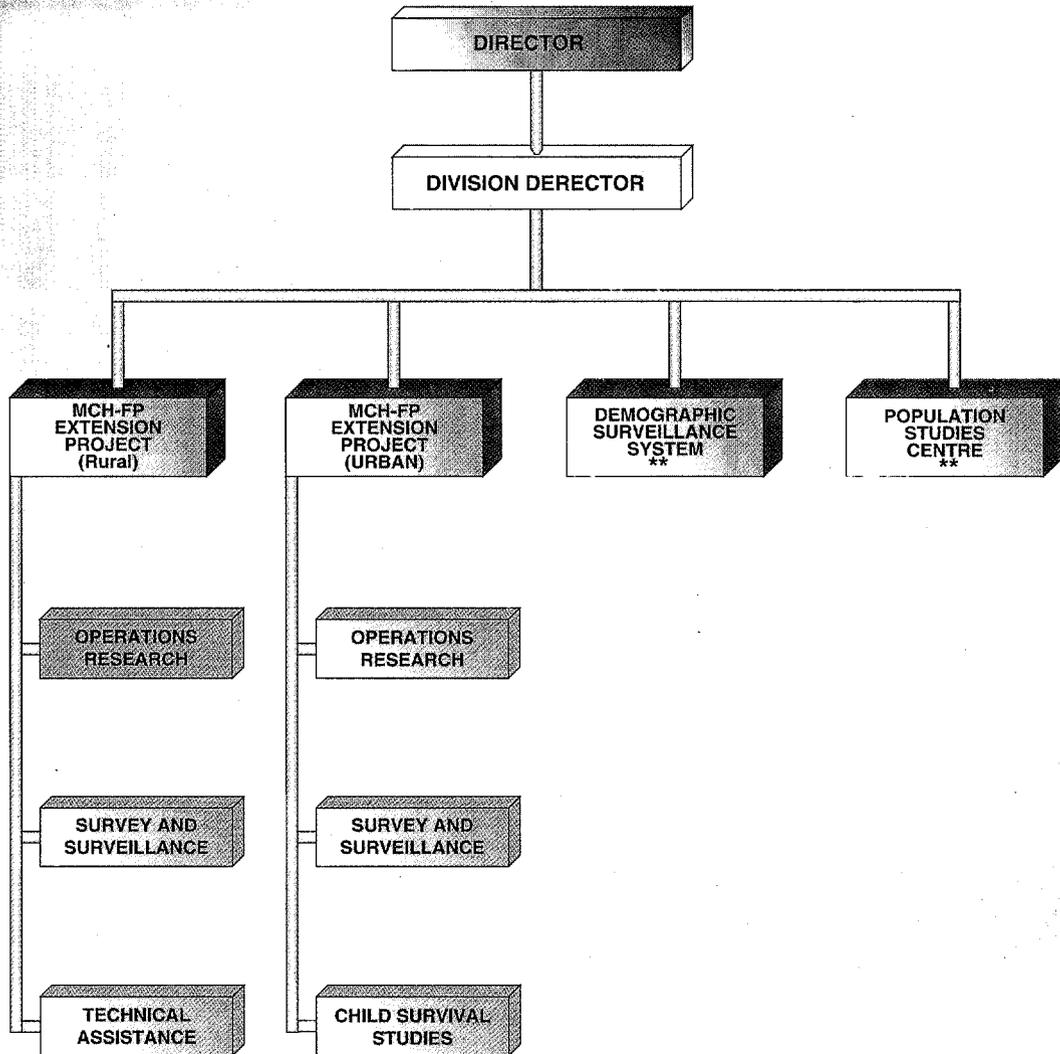
Since January 1995 a core group of its members have been collecting relevant background information on the subject. In both April and at the end of May two draft reports were reviewed by all members of the Task Force and in June an Interim Report was submitted to the Director of ICDDR,B. ■



Ine Feltenstein

*With a mortar and pestle as his only tools, here's the doctor of choice for many a Bangladeshi rural family.*

# POPULATION AND FAMILY PLANNING DIVISION \*



\* Since December this has been reorganized and renamed the Health and Population Extension Division

\*\* Until late '95. Now under CHD.

# **PFPD**

## **Population & Family Planning Division**

**Division Director**  
**Syed Shamim Ahsan**

After a major reorganization in late 1995, the Population and Family Planning Division (PFPD) assumed a new name, the Health and Population Extension Division (HPED). For most of the year it was known as the Population and Family Planning Division and witnessed several changes in Division leadership during that time. Dr. Michael Strong completed his tenure in June and Dr. Radheshyam Bairagi was appointed in an acting capacity from July through November 1995.

In December, Mr. Syed Shamim Ahsan was appointed to head the newly reorganized Health and Population Extension Division.

### **Division Highlights**

*The Division was reviewed in March by the Board of Trustees' Programme Committee, which included three Board members and three prominent external experts. The review team's report was discussed at the Board meeting in June and the Division's response discussed at the meeting in November. On the whole, the review was positive about the Division's overall scientific activities; however, the team made several recommendations, including possible reorganization of the Division.*

- The new Division Director, Mr. Syed Shamim Ahsan, assumed his duties in December following reorganization of the Division.
- The Division produced, for broader dissemination, a consolidated Intervention Update booklet which provides brief summaries of significant operations research activities of the various projects of the Division.
- A new dissemination tool in the form of a flyer—"Intervention Update"—was initiated by the MCH-FP Extension Project (Rural) in November to rapidly share the preliminary findings of the project's ongoing interventions with policy-makers, programme managers, and donors.
- The MCH-FP Extension Project (Urban) took the lead in launching the "Urban MCH-FP Initiative"—a collaborative partnership consortium of NGOs, GoB and the Centre in April 1995 to improve and strengthen maternal and child health and family planning service delivery in urban areas.

*Continued...*

**PFDP** The reorganization of the Division included :

- Relocation of the Matlab Demographic Surveillance System (DSS) and the Population Studies Centre (PSC) to the Community Health Division; and
- Relocation of the the Environmental Health Programme (EHP) and the Epidemic Control Preparedness Programme (ECP) to the new HPED Division.

The Division has a long history of accomplishments in applied research, which focuses on the application of simple, effective, appropriate and accessible health and family planning technologies to improve the health and well-being of the underserved and population-in-need. There are several distinctive characteristics of these endeavours in relation to health services and policy research.

For one, the public health research activities of these projects of the Division focus on improving programme performances, thus involving policy implications at the national level as well as lessons for the international audience.

Secondly, these projects incorporate the full cycle of conducting applied programmatic and policy-relevant research in actual GOB and NGO service delivery infrastructures; dissemination of research findings to the highest levels of policy-makers as well as to recipients of the services at the community level; application of research findings to improve programme performance through systematic provision of technical assistance; and scaling-up of applicable findings from pilot phase to the national programme at Thana, Ward, District and Zonal levels, both in urban and rural set-

## Division Highlights

(Continued from previous page)

- The MCH-FP Extension Project (Urban) provided TA (technical assistance) to Chief Health Officers of the Dhaka City Corporation and other municipalities to identify urban health priorities. The results of the workshop were forwarded for inclusion in the Fifth Five-Year Plan of the Government.
- Development of a model Emergency Obstetric Care (EOC) unit was initiated by the MCH-FP Extension Project (Rural) in the project's laboratory Thana in Mirsarai, Chittagong. The EOC was inaugurated by the Honorable Minister of Health and Family Welfare.
- A comprehensive internal review of the MCH-FP Extension Project's (Rural) scientific activities was undertaken in October 1995 by an external expert, Dr. John Stoeckel, who reconfirmed the scientific rigor and relevance of the Project's research and technical assistance activities to the national MCH-FP programme.
- Both the Urban and Rural Extension projects undertook an extensive exercise to prioritize their research agendas in consultation with the GOB, NGOs, and donor partners.
- DSS completed the 1992 Annual Report and initiated the start-up activities for the rolling census in DSS areas in Matlab.
- A ground-breaking study to understand the levels, trends and correlates of contraceptive failure, including method-specific failure rates in Matlab, was undertaken by the Population Studies Centre.

## Population Studies Centre

Studies Director: R. Bairagi

The mission of the Population Studies Centre (PSC) is to undertake research on population growth, its determinants, consequences, and implications for well-being and health of the community. PSC takes advantage of several unique population databases and the Centre's field operations in Matlab and other demographic surveillance areas.

PSC organizes monthly population seminars where the results of ongoing studies are presented to planners, policy makers, and researchers. PSC scientists provide technical assistance to national and international organizations in demographic and statistical studies.

### The following research projects were undertaken or completed in 1995:

#### Evaluation of the Bangladesh 1993-94 Demographic and Health Survey

PI: R. Bairagi

Funded by: Macro International

In the absence of a vital registration system, cross-sectional surveys are the main source of fertility and mortality data in most developing countries. Response errors in such data can be considerable, frequently leading to inaccurate results. The Demographic Surveillance System (DSS) in Matlab provides a unique opportunity to evaluate survey methodology and the results of the 1993-94 Bangladesh Demographic and Health Survey (BDHS). A validation of the BDHS was undertaken in the Matlab DSS area.

The preliminary results suggest that Matlab mothers can report their fertility quite correctly but they under-report contraceptive use and mortality of their children. A paper on the preliminary results of the study was presented at the 1995 Annual Meeting of the Population Association of America and additional work will continue in 1996.

#### Development of methodology for Thana-based community health surveys

PI: R. Bairagi

Funded by: Thana Functional Development Pilot Project

A manual for conducting a community survey for baseline information regarding perception of the community about the present health and family planning services provided by the government was prepared as part of this study. The manual contains sampling design, sample size, data collection methodology, defi-

nition of target groups and relevant key informants, questionnaires, and data analysis plans and programming. The manual can be adapted for application in similar projects in other countries.

#### Proximate determinants of fertility in Bangladesh

PI: R. Bairagi

Funded by: East-West Center

This study will use the data of the 1993-94 Bangladesh Demographic and Health Survey (BDHS) to investigate socioeconomic and demographic differentials of fertility in Bangladesh. The Bongaarts model will be used to study the fertility-inhibiting effects of the major proximate determinants for fertility transition in this country. The study is expected to provide a better understanding of the causes of fertility decline in Bangladesh and thus help policy-makers develop appropriate interventions related to population control. The study will continue in 1996.

#### Levels, trends and correlates of contraceptive failure in Matlab

PI: R. Bairagi

Funded by: The Ford Foundation

Contraceptive failure was found to be a big problem in the Matlab MCH-FP area in 1994. The general fertility rate was lower and contraceptive use higher in the Matlab MCH-FP area in 1994 than the country's corresponding rates in 1993-94. This study will investigate levels, trends and correlates of contraceptive failure for the period of 1978-93 in Matlab. Estimates of method-specific failure rates will enable policy makers to ascertain the magnitude of the problem, and its determinants should help in identifying target groups for any action such as counselling or change in method mix in a programme. The project will continue in 1996.

#### Child mortality in Matlab: levels, trends and correlates

PI: R. Bairagi

Funded by: Core funds

Despite a substantial decline in the last two decades, infant and child mortality in Bangladesh are still at an unacceptably high level. The objective of this study is to investigate the levels, trends, correlates and causes of deaths of under-5 children in Matlab. Data for this study will come from the birth, death and migration files and the database of the DSS for the period 1966-1994. The results of this study will be compared with the national results obtained from three surveys and a study on verbal autopsy of

death. The results of this study should be useful to policy-makers in developing appropriate interventions to reduce child mortality in this country.

### Other Activities

ICDDR,B was granted membership in the Committee for International Cooperation in National Research in Demography (CICRED). Two scientists from the

Centre were invited to participate in the CICRED Seminar on "Demographic Evaluation of Health Programs" to be held in Paris from 26 to 28 February, 1996. PSC has been working on a request of the International Union for the Scientific Study of Population (IUSSP) to organize a session on "Gender Preference of Children and Its Consequences" at the 23rd General Conference of the IUSSP to be held in Beijing from 11 to 17 October, 1997.

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

Vital rates (per 1,000)	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994a
<b>Crude birth rate</b>												
Treatment area	34.2	30.7	34.6	33.6	33.6	30.9	28.4	28.3	25.4	25.4	24.7	25.6
Comparison area	42.6	37.3	42.6	39.6	39.2	40.4	36.6	37.8	32.7	31.1	29.4	29.4
<b>Total fertility rate<sup>b</sup></b>												
Treatment area	4.5	4.0	4.5	4.3	4.2	3.8	3.4	3.4	3.0	3.0	2.9	3.0
Comparison area	6.1	5.1	6.0	5.5	5.4	5.4	4.9	5.0	4.3	4.0	3.8	3.8
<b>Crude death rate</b>												
Treatment area	11.9	13.4	10.2	9.9	9.3	8.7	8.0	7.6	8.1	8.3	7.7	8.0
Comparison area	16.7	17.3	14.2	12.2	11.2	11.0	9.5	9.4	10.2	9.8	10.2	9.1
<b>Neonatal mortality rate<sup>c</sup></b>												
Treatment area	56.4	57.9	52.5	45.4	43.8	42.8	46.0	47.8	47.7	49.6	42.8	36.6
Comparison area	70.3	71.4	69.4	53.0	54.9	57.7	52.7	53.3	63.2	53.3	64.5	55.5
<b>Post-neonatal mortality rate<sup>c</sup></b>												
Treatment area	41.8	56.9	33.8	36.4	34.6	38.0	28.3	27.4	32.3	30.8	20.3	28.2
Comparison area	42.2	55.7	49.1	39.7	39.5	39.0	38.0	34.1	51.7	37.0	34.8	30.7
<b>Infant mortality rate<sup>c</sup></b>												
Treatment area	98.2	114.8	86.4	81.8	78.4	80.8	74.3	75.2	80.0	80.5	63.1	64.8
Comparison area	112.5	127.1	118.4	92.7	94.4	96.6	90.7	87.5	114.9	90.2	99.3	86.2
<b>Child mortality (1-4 yrs.)</b>												
Treatment area	21.9	23.1	16.4	13.4	9.9	7.6	6.4	5.3	7.0	5.9	5.9	5.2
Comparison area	35.3	39.2	24.6	20.7	15.0	14.4	11.5	9.3	9.1	10.4	10.0	7.1
<b>Rate of natural increase</b>												
Treatment area	22.3	17.3	24.4	23.7	24.3	22.1	20.4	20.7	17.3	17.1	17.0	17.6
Comparison area	25.8	20.0	28.4	27.4	28.0	29.4	27.1	28.4	22.5	21.2	19.2	20.3

<sup>a</sup> Provisional data

<sup>b</sup> Per woman

<sup>c</sup> Per 1,000 live births

## Matlab Demographic Surveillance System (DSS)

Project Directors: M. Strong (until June);  
R. Bairagi (Acting: July-October);  
J.K. van Ginneken (from November)

Funded by: ODA, UNFPA, the Netherlands  
and Core funds

The Matlab Demographic Surveillance System (DSS) is a component of the Matlab Project and has been in operation since 1966. It has collected data on vital events from a population that initially comprised some 140,000 people and has grown (despite contraction in geographical coverage) to about 200,000 individuals. It is unique in the sense that it is the only project in the developing world with continuous surveillance for about 30 years.

The DSS records five types of vital events: pregnancy outcomes, deaths, in- and out-migration, internal movement, and changes in marital status. Vital events data are transferred to the Centre's headquarters in Dhaka and checked before entry into a large database.

As of December 1, the DSS Project was transferred from PFPD to the Community Health Division.

### Demographic Surveillance System (DSS) Reports

By the end of 1995, the 1991 and 1992 DSS Annual Reports were published and the Annual Report for 1993 had neared completion.

### Early Indicator Series

Since DSS Annual Reports are large and complex and thus somewhat difficult to produce and understand, a brief report presenting key demographic indicators is now produced as an "Early Indicator Series."

### 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 carried out by the members of the DSS staff on selected topics in the broad area of levels, trends and determinants of fertility and mortality.

### 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 support from The Population Council. The overall purpose of the project is to improve the effectiveness and efficiency of the national family planning (FP) and maternal and child health (MCH) programme through operations research (OR), dissemination, and technical assistance (TA).

Operations research is carried out in three government field sites: Abhoynagar Thana in Jessore District, Mirsarai Thana in Chittagong District, and Sirajgonj Sadar Thana in Sirajgonj District. In addition, 13 rural thanas of Chittagong district serve as non-intensive laboratory areas.

The project focuses on three major areas of OR in the field of MCH-FP of the national programme:

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

The redesignated Survey and Surveillance Committee (SSC) activities provide the basis for monitoring and evaluating various interventions of the Project.

### Improvement of Management Capability

Three interventions were initiated in 1994 and continued throughout the year:

"Design on performance planning and monitoring at the local level" attempts to enhance the skills of thana managers (TFPOs) and union supervisors, known as Family Planning Inspectors (FPIs). The FPIs were trained on how to use data to identify problems of poor performance, seek solutions to the problems identified, and set workers' goals. Based on the experience of this intervention, a manual on performance planning and monitoring has been developed for thana managers.

Preliminary findings of the performance planning intervention indicate that bi-monthly FWA (Family Welfare Assistant) contact with clients has increased from 20 to 30 percent in the intervention union of Mirsarai between October 1994 and August 1995. There is also evidence of an improvement in the quality of service statistics generated by the FP field workers in the intervention unions.

A monitoring tool known as the FPI Diary has been developed with the objectives of improving the performance of FP field workers and also the quality of data. The MOHFW found the FWA Register, an MIS tool developed by the Project, to be useful in improving the performance of field workers.

The Project, in collaboration with the MIS Unit of the Directorate of Family Planning (DFP), has designed the third generation FWA Register along with a manual. Following a similar strategy, a register was developed for the Health Assistants (HAs), who provide primary health care services to the community. The HA Register was field-tested at Abhoynagar, and was approved by the MOHFW for nationwide implementation.

A pictorial multipurpose client card, containing information and counselling on MCH-FP, immunization, obstetric care, and selected health care aspects, has been developed by the Project. The card, known as the MCH-FP Client Card, will be helpful for both providers and clients, since it will replace the five existing cards presently being used by providers and clients. After review of the card by the Director General, Family Planning, and Director General, Health Services, it will be introduced in the national programme.

The successful interventions currently being fieldtested at Mirsarai and Abhoynagar thanas will be scaled up to other thanas of Chittagong District under the Project's "District Approach" (DA) intervention. The concerned health and FP managers of the other 13 rural thanas of Chittagong District are being sensitized, motivated, and updated on various Project activities being undertaken at Mirsarai and Abhoynagar through workshops, meetings, training, needs assessment, etc.

A rapid assessment procedure for needs assessment of the MCH-FP programme, as well as the demand and utilization of MCH-FP services at the thana level and below, has been developed. This will help thana managers identify strengths, weaknesses, opportunities, and constraints of the programme, and thereby help them develop strategies for programme improvement. Currently, the Project is providing technical assistance to thana managers in conducting needs assessments in the thanas of Chittagong District under the Project's district approach intervention.

A simulation, based on needs assessment studies conducted with this procedure in five thanas of Chittagong District, indicates that contraceptive prevalence rate (CPR) could be raised to 50 percent from the current average of 39 percent if regular contact between women and FWAs is established. This information can be used by the district and thana managers for programmatic improvement.

Three district approach dissemination workshops were conducted in Chittagong. Concerned health and family planning managers of Chittagong District and its 14 rural thanas as well as officials from the MOHFW and

those of the directorates of Family Planning and Health Services participated in these workshops. Concept papers of various interventions and preliminary findings of ongoing interventions were presented and reviewed at these workshops. This process of review and feedback will facilitate the process of nationwide implementation of innovative and successful interventions.

As part of the district approach (DA) to develop the capacity of thana managers in enhancing quality of services, a workshop on a new technique of decontamination of equipment used for clinical contraceptive methods was arranged with the collaboration of the Family Planning Services and Training Centre (FPSTC) for the Medical Officers (MCH) of 14 rural thanas of Chittagong District.

The Management Improvement Group has designed two new interventions to further improve the health and FP programme. The intervention "Systems Approach for Promoting Basic Health Services" will develop a package of services for maternal and child health, FP, and other reproductive health services.

The objective of this intervention will be to improve the existing service-delivery approach in two unions by introducing a basic health service package at FWC, combined satellite clinic and EPI sites. A constellation of services will be provided by FWAs at cluster sites.

The whole service-delivery approach will be supported by: a package of appropriate monitoring tools at the thana and union levels; a systematic review of performance by the thana and district officials; and by developing an institutional capacity for ongoing training at the FWC and the thana level for further skill development of workers and supervisors, for rapid assessment procedures to ensure quality of data, and for referral linkages from the Traditional Birth Attendants (TBA) to the Thana Health Complex (THC).

The impact of the intervention will be measured on the basis of knowledge and skill of the providers, supervision and monitoring activities, quality of data, awareness of the clients about available services and utilization of such services. Lessons learned will be shared through workshops and policy papers for replication in the national programme.

The testing of the basic service package intervention was approved by the Project's Executive Committee of the National Steering Committee. The National Steering Committee is chaired by the Secretary, MOHFW and the Executive Committee is chaired by the Joint Secretary, Family Welfare Wing of the MOHFW.

The other new intervention, "Networking of Government and Non-Government Family Welfare Service Providing Agencies," will develop and enhance coordination for union-level GOB and NGO family welfare service-providing agencies.

### Improvement in the quality of care of MCH-FP services

The Quality of Care (QoC) Working Group concentrated on maternal and neonatal health and developed an intervention "Strengthening Maternal and Neonatal Health: Improving Linkages at all levels." Two other interventions on the management of reproductive tract infection (RTI) and the management of contraceptive side-effect management will be implemented within the intervention "Systems Approach for Promoting Basic Health Services" shown under the Management Improvement Group. The "Maternal and Neonatal Health" intervention will attempt to increase the number of pregnancy terminations by trained personnel at different levels, increase the number of cases of complications managed by trained personnel, increase the coverage of antenatal and postnatal care, and improve the quality of neonatal care.

The MOHFW has constructed a new maternity centre at the Mirsarai Thana Health Complex (THC), which now has the facilities to provide comprehensive EOC. Basic EOC services continue to be offered at the Abhoynagar THC. In addition, blood transfusion has started.

The average number of patients has risen in Mirsarai to over 25 per month after the opening of the new maternity unit at Mirsarai compared to its past admission count of 15 patients per month. A study found that less than two percent of women with complicated pregnancies came for the THC maternity services before the new Maternity Centre was built. A substantial proportion of the complicated cases under study went to the maternity unit after 48 hours of labour pain. Assistance was sought from multiple unqualified birth attendants before the women went to the maternity unit. At Abhoynagar, where the intervention began in 1993, the number of admissions increased steadily (see figure on right).

Research by the QoC group suggests that the management of RTI by the paramedics at Family Welfare Centre requires improvement. Another study found that a substantial proportion of contraceptive users were not satisfied with the management of side-effects related to method use. Training of workers and paramedics and close supervision can improve side-effect management.

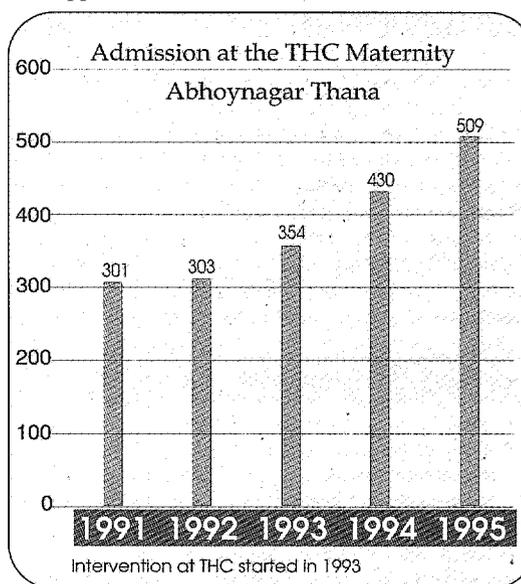
### Promoting the sustainability of the national MCH-FP programme

Two interventions were initiated in an effort to determine the extent to which the existing doorstep delivery of MCH-FP services or the community-based distribution (CBD) system can be modified to reduce dependence on the field workers. The intervention, known as cluster visitation, is being field tested, under which FWAs counsel and distribute contraceptives from a "cluster household" to the women of surrounding households. This approach will serve two purposes. First, it will result in the reduction of travel time of workers, and thereby increase coverage of clients for counselling and supply of methods and management of side-effects. Second, village women will develop a norm of seeking out-of-home FP-MCH services.

Preliminary findings show that:

- MCH-FP service delivery from cluster spots has increased and delivery at the homes of clients has decreased;
- one-third of the users and more than one-tenth of the non-users visit cluster spots; and
- there is a need for special Information, Education and Communication (IEC), involving the house owners of the cluster spots.

Beginning January 1996, supplies at the doorstep will be stopped in the intervention unions to examine the



extent to which the cluster visitation approach of service delivery is effective and sustainable.

The second sustainability intervention involves provision of a range of quality FP-MCH services, including antenatal care, postnatal care, injectable contraceptives, IUDs, side-effect management of contraception, and health education by female health workers, Family Welfare Visitors (FWVs) through an increased number of satellite clinics (SCs), held jointly with EPI sessions.

Twenty to 24 such sessions are being held per month compared to eight per month per union nationwide. Through this intervention women are likely to develop a habit of going out of their homes to seek health services.

Preliminary findings show that there is at least a three-fold increase in client attendance at the joint satellite clinic sessions. However, contraceptive acceptance has increased only slightly. It has also been observed that: (a) satellite clinics are utilized more by the poor or less-educated sections of the community; (b) contraceptive users attend SCs for other services more than non-users; and (c) there is a need for IEC to make clients aware of comprehensive services available at SCs.

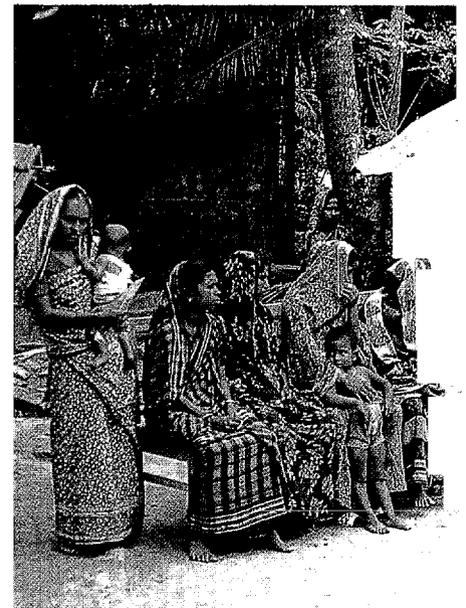
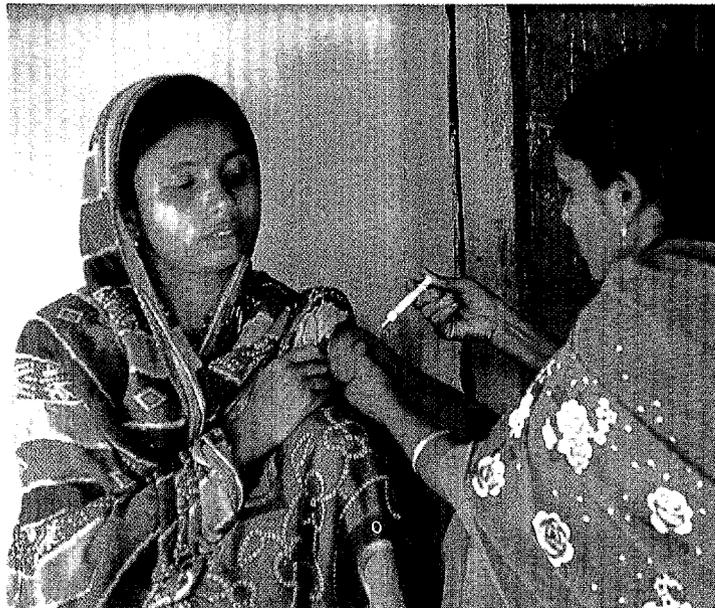
An intervention, "charging for services and supplies," has been developed with the objectives of: (a) developing cost recovery, (b) increasing clients' use of static service-delivery points instead of their homes, and (c) supplementing funds through application of user fees.

The intervention proposes that there be fees for services and supplies if delivered at clients' homes – as opposed to the free services provided at Cluster Spots, the Satellite Clinic, Family Welfare Centre or Thana Health Complex. Also, there will be charges for temporary methods, for which demand is high, while there will be no charge for long-acting methods.

### Other Research Activities

The Sample Registration System (SRS) continues its surveillance and occasionally conducts small surveys at all field sites and develops data-collection instruments to obtain intervention-specific information so as to monitor the effects of various interventions on an ongoing basis.

Research on women's status and fertility regulation behaviour indicates that contraceptive use is higher among women who have higher status, as measured



*(Above left) Injectable contraceptives are an extremely popular method of family planning, and the Centre continues to work with the Government of Bangladesh to maintain quality as this method of contraception is introduced nationwide. (Above center) The work of the MCH-FP Extension Project (Rural) has demonstrated that Satellite Clinics are well attended and are a particularly effective way of reaching the poor and less-educated*

by several indicators such as decision-making powers, mobility, and support for family planning. Women who have income-earning activities, who handle cash, or who are members of NGOs rank high in all indicators. Contraceptive use and fertility were significantly associated with female education, employment and access to the mass media.

A study was conducted to assess the type and quality of services as well as client satisfaction with such services at the FWCs. It was found that curative care is the most frequent service offered at FWCs but that clients are not fully aware of other services available. Treatment practices and communication between clients and providers are not satisfactory. There is an urgent need to redefine the standards of care at FWCs, and take appropriate action to implement them.

A survey was conducted in the Project field sites to study awareness among women and FP workers about sexually-transmitted diseases (STDs). Only three out of 10 women knew about syphilis and/or gonorrhoea. Thirty percent stated that syphilis and 13 percent stated that gonorrhoea are transmitted through sexual activity and contact with previously

infected persons. Awareness and knowledge of transmission of STDs were significantly higher among educated and relatively older women.

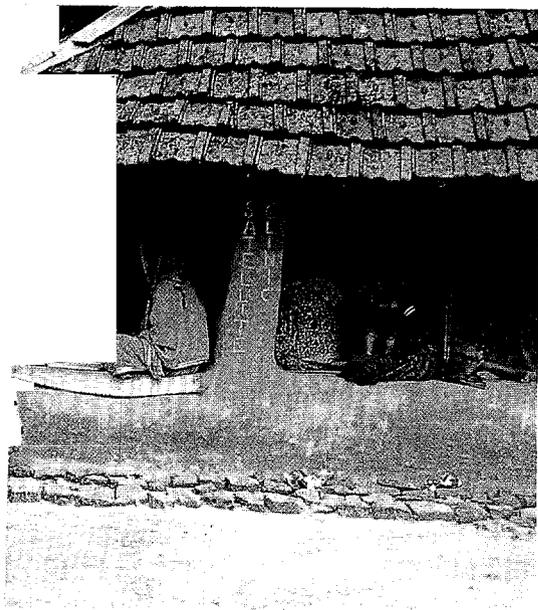
Using longitudinal datasets, an assessment on the impact of child mortality on acceptance and discontinuation of contraception was made. The findings indicate that contraceptives may be acceptable both for limiting and spacing purposes among parents, even if their last child has died, in families with more than four other surviving children. Even in families with four or fewer surviving children and among parents whose last child died, contraceptives may also be acceptable for spacing purposes. Family planning programmes in Bangladesh can substantially reduce excess fertility by counselling, motivating, and supplying contraception to the parents whose child dies.

#### **MCH-FP Extension Project (Urban)**

Project Director: A.H. Baqui

Funded by: USAID

The MCH-FP Extension Project (Urban) conducts operations research and provides technical assistance to agencies of the GOB and to NGOs through a partner-



*Building on the Safe Motherhood work in Matlab, the MCH-FP Extension Project (Rural) is conducting operations research on Emergency Obstetric Care Services that have been initiated in the Abhoynagar and Mirsarai Thana Health Complexes*

ship effort known as the "Urban MCH-FP Initiative." The broad purpose of the Initiative is to improve and strengthen urban MCH-FP service delivery.

The specific objectives are:

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

The project's responsibilities for the Initiative include operations research, technical assistance and dissemination activities. For these purposes, the Project is organized into four teams: Quality of Care, Health Financing and Sustainability, Management Improvement and Technical Assistance, and Survey and Research Support.

From February 1995 a number of seminars were held for senior government officials, NGOs and international agencies to disseminate results from needs assessments carried out in Zone 3 of Dhaka City Corporation. The Project also organized an official launching ceremony for the Initiative in May.

During this period a set of interventions was designed, based on research findings and advice from GOB and NGO partners at various levels. Implementation of these interventions began later in the year, and more comprehensive studies were completed on current urban service-delivery strategies and patterns of urban health care demand, cost and quality of care.

**Other significant contributions made by the project included:**

- organizing a workshop in collaboration with the the Johns Hopkins University and the Office of Population and Health of USAID, Dhaka, to identify urban MCH-FP research priorities;
- providing assistance to GOB to plan and organize a workshop with Health Chiefs of major municipalities to identify health issues critical to the country's next planning cycle;
- acting as the initial secretariat of the Urban Health Forum;

- participating in the mid-term evaluation of the Child Survival Project of World Vision, Bangladesh, in Khulna City; and

- participating in training courses organized by the Centre.

**Operations Research on Management Improvement and Technical Assistance**

During 1995 this team provided leadership for the development of Zonal Coordination Committees. All Zones of Dhaka City now have Coordination Committees generating local innovations and collaboration among NGO representatives, government agencies and elected leaders. This coordination has made it possible to combine resources to increase access for high-risk populations, to establish shared facilities for clinical waste disposal and to improve the organization of child survival campaigns. All committees have developed action plans for 1996. Lessons already learned have been translated by the Ministry of Local Government, Rural Development and Cooperatives, into circulars instructing the establishment of similar structures in all urban areas of the country.

In August 1995 the project began to test two modified health information systems to promote comprehensive services. One is a new record-keeping system for urban field workers and the other involves replacing current clinic registers with a system of home- and clinic-based card that fosters quality of care. An inventory of facilities and a set of maps outlining the distribution of the major health and family planning services in all zones of Dhaka City has been completed. This inventory is designed to identify realistic ways to improve the use of existing resources.

The project is assisting the Government in a review of the DCC Health Department. Staff inventories as well as revised organograms and job descriptions are being developed. This experience will be valuable in efforts to reorganize health departments in other municipalities of Bangladesh.

Existing strategies for service delivery are being analyzed with information from Zone 3 of DCC. The issues involved have important implications for urban systems design in the regional and international context. They include a study of pharmacies as providers of family planning and selected child health services; a study of the output of vaccination centres; an appraisal of the role of field workers and an assessment of the impact on knowledge and practices of the national polio immunization days conducted in 1995.

### **Operations Research on Quality of Care and Quality Assurance**

During 1995 the QoC Team provided leadership for the development of three interventions related to the improvement of basic MCH and FP services in urban areas: (1) a quality assurance programme for clinic-based services, (2) a quality assurance programme for community-based services, and (3) a programme to strengthen the capabilities of clinics to provide a basic package of MCH-FP services.

These interventions seek to develop mechanisms to strengthen the use of information by providers and to assist teams undertaking the critical analysis of constraints to effective service delivery and the identification of local approaches for problem-solving.

The team has completed an analysis of the quality of care of field worker services provided in Zone 3 of Dhaka City as well as a functional analysis of the clinic services in Zone 3. A paper describing a recommended basic package of MCH-FP services has been completed as well as a paper describing the current package of services provided by the project's NGO counterpart, Concerned Women for Family Planning.

The package of basic services that has been designed for implementation in different clinics in Dhaka beginning early in 1996 includes (1) family planning, (2) EPI and vitamin A, (3) diarrhoeal disease prevention and treatment, (4) acute respiratory disease treatment, (5) nutrition education (including promotion of exclusive breast feeding), (6) reproductive tract infection prevention and treatment, and (7) provision of antenatal and postnatal care and promotion of safe delivery.

The objectives are to (a) develop, test and replicate simple service-delivery protocols for the first facility contact for each of these services, and (b) to develop and implement community-based communication strategies.

Research activities initiated during the year and still underway concern infant feeding practices, population-based MCH-FP output indicators in Zone 3 of Dhaka City, initiation of a computerized verbal autopsy protocol, and a comprehensive assessment of immunization coverage in Zone 3.

### **Operations Research on Health Financing and Sustainability**

This team was formed in March 1995, with a research agenda that concerns the economic aspects of health and family planning services in urban areas. Team

members provide technical assistance on financial allocation, cost recovery and sustainability of urban health and family planning services delivery for wider replication in the municipalities of Bangladesh.

The team conducted a comprehensive needs assessment of the urban population in Bangladesh in February 1995 by reviewing access to and utilization of basic services in the urban areas of Dhaka and through secondary analysis of data from the 1993-94 Bangladesh Demographic and Health Survey and the slum Urban Surveillance System (USS) of the Urban Health Extension Project collected between 1991 and 1993.

The study was carried out in collaboration with the Johns Hopkins University and Dhaka University. The analyses were substantiated and supplemented with further primary data on qualitative aspects of the community's perceived needs as well as their access to and investments in basic urban services. Preliminary findings were presented to donor, GOB and NGO partners at several workshops.

Other research activities during 1995 included demand analysis of household health care use and expenditure patterns, choice of providers and willingness to pay for basic maternal and child health and family planning services in the urban areas.

The team also conducted research on determination of unit cost of services by providers in Dhaka City through observation of time allocation, rapid assessments and budget inventories, which will assist in designing cost-recovery interventions for efficient allocation of time and other resources.

Additional research included a pricing survey of health and family planning facilities in Dhaka. During the reporting period, the team developed interventions on alternative MCH-FP service delivery systems for the urban areas that shift the emphasis from home visits to a greater reliance on fixed service delivery points as the source of a basic package of MCH and FP services.

### **Survey and Research Support**

In January 1995 the project began the quarterly data collection included in the Urban Panel Survey (UPS) of Zone 3 of Dhaka City. The UPS provides community-based data to assist in the design, monitoring and evaluation of the project's interventions. It is based on a multi-stage area sampling that includes approximately 6,000 slum and non-slum households containing a population of 31,000 persons.

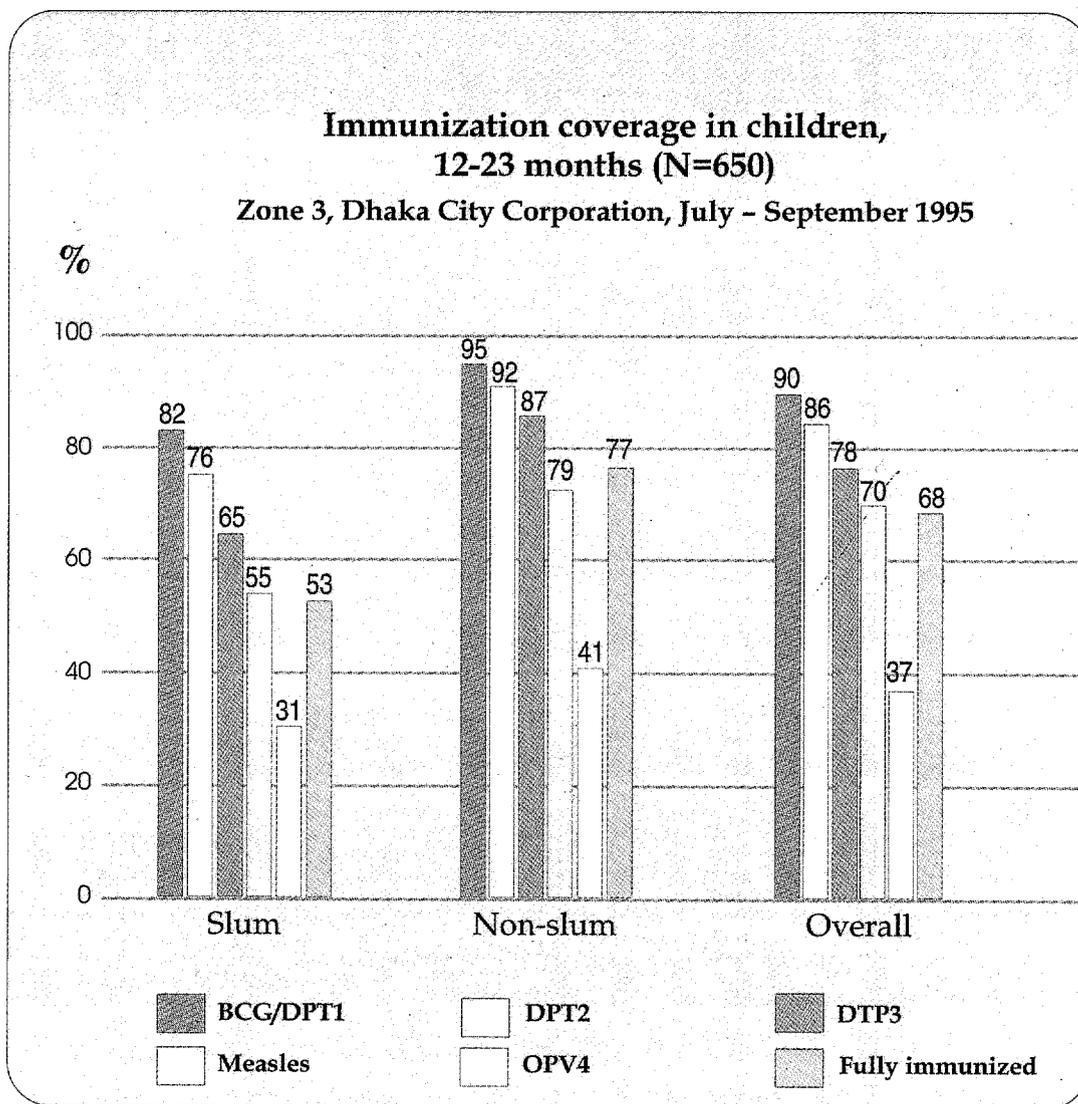
In addition to the quarterly collection of health and family planning information, special surveys have been completed, using the UPS population, on the following topics: infant feeding, coverage of National Immunization Days, health care demand and expenditure, child and TT immunization, fertility intentions, community-based quality of care indicators and neonatal deaths. UPS also collects annual information on the socioeconomic status of the households in the study area.

**Research Initiative for Safe-motherhood and Child-health (RISC)**

PIs: G. Antelman, S.E. Arifeen, N. Fronczak and S. Osendarp

Funded by: The Netherlands Government, with partial funding from USAID

The Research Initiative for Safe-motherhood and Child-health (RISC) includes six independent studies addressing important issues regarding maternal and



child health for the slum population. Three studies are being implemented together in the same population cohort using a prospective observational design. The issues being covered by the studies are: early postpartum morbidity, choice of care provider, determinants of birth weight, gestational age and perinatal mortality, and the effect of birth weight on infant mortality.

Preliminary results from these studies show that only 56% of the women in the sample had at least one antenatal care consultation with a qualified medical practitioner. Eighty-two percent of the women delivered in their homes, with 76% of these home deliveries performed by an untrained birth attendant. Five percent of the women who delivered in their homes delivered by themselves. Religion, geographic proximity, and gravida were related to place of delivery. Post-partum physical examinations of the mothers found perineal tears in 15% of the mothers, with 7% of these being infected. Ten percent of the women had uterine prolapse. The rate of low birth weight and preterm delivery among the newborn was 45.4% and 4.4% respectively. Birth weight was an important determinant of neonatal mortality.



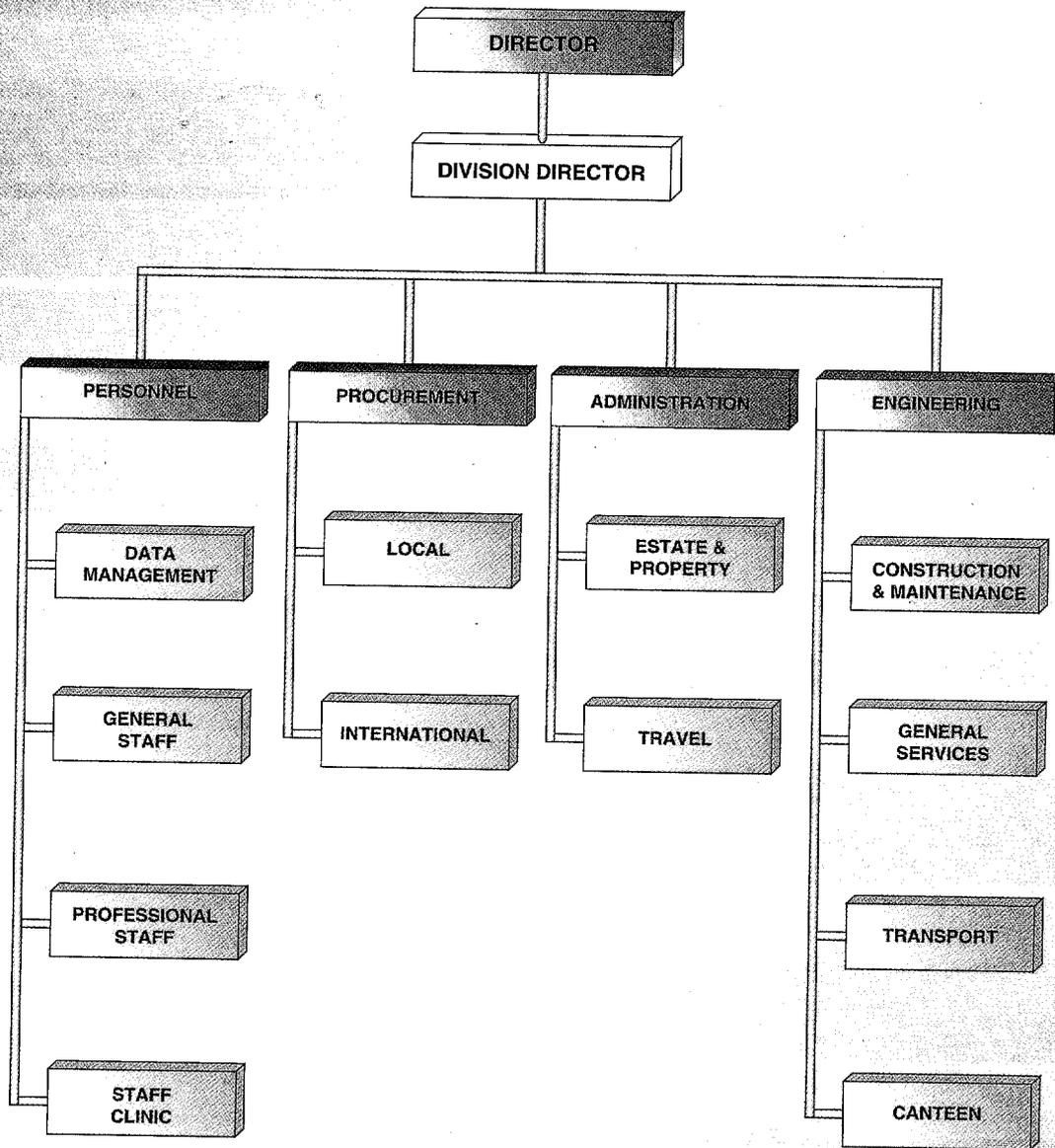
*The MCH-FP Extension Project (Urban) works with the Ministry of Health and Family Welfare, Dhaka City Corporation and Concerned Women for Family Planning to improve health conditions in the crowded Dhaka slums*

A fourth study on the effect of zinc supplementation during pregnancy on infant birth weight, growth, morbidity and immune response has been approved by the Ethical Review Committee and preparations for implementation are underway.



*The Launching Ceremony of the Centre's Urban MCH-FP Initiative was attended by many senior policy-makers, including the Ministers and Secretaries of Health and Family Welfare, and Local Government, Rural Development and Cooperatives, and the Mayor of Dhaka City Corporation*

# ADMINISTRATION & PERSONNEL DIVISION



## **A&P**

# **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**

- A second floor (8,000 sft.) has been constructed over the existing library building.
- The PABX was upgraded with an additional 50 internal telephone connections.
- Ten new vehicles were added to the Centre fleet.
- A survey of firefighting facilities was done and a staff training programme on safety measures, including firefighting, was held.
- The Division provided logistic support to facilitate the visits of high-profile dignitaries from around the world.

#### **Personnel Branch**

Chief Personnel Officer  
Wahabuzzaman Ahmed  
Personnel Manager  
M.A. Jabbar

At the end of 1995, the Centre had 1,010 staff members, of whom:

31 were International (13 on Secondment);  
163 National; and  
816 in the General Services category.

The Centre also had 154 Community Health Workers and 110 Health Workers.

#### **Departures**

**Dr. Dilip Mahalanabis** (India), Division Director of the Clinical Sciences Division, returned to India after completing his seven-year assignment at the Centre. **Dr. Michael A. Strong** (USA), Division Director of the Population and Family Planning Division, completed seven years of assignment in June 1995 to become Advisor to the Office of Population in the Prime Minister's office in Addis Ababa, Ethiopia. **Dr. O. Masee Bateman** (USA), Epidemiologist in the Community Health Division, resigned in May 1995. **Dr. Bateman** was with the Centre for three years. **Dr. Rushikesh Maru** (India), Associate Director of the Rural MCH-FP Extension Project (seconded by the

Population Council), resigned in June 1995. Dr. Maru served the Centre for six years. He was initially seconded by the University of Michigan as Operations Research Scientist. **Dr. Samuel Erny** (Switzerland), International Research Fellow, Matlab MCH-FP Project, left the Centre in September. Dr. Erny was with the Centre for four years.

### New Professional Staff

**Mr. Syed Shamim Ahsan** (Bangladesh) joined in December as the Senior Advisor and Head of the Health and Population Extension Division (which evolved from the recent restructuring of the Centre). Prior to this appointment, Mr. Ahsan was Senior Advisor to the Director on secondment from the Population Council. **Prof. J. Patrick Vaughan** (UK) joined the Centre in September as Division Director of the Community Health Division on secondment from the London School of Hygiene & Tropical Medicine. Dr. Vaughan has been involved in various disciplines, including research management and training. In addition, he has had extensive advisory and consultancy experience in the UK and overseas. **Dr. Jeroen K. van Ginneken** (The Netherlands) joined the Centre in November as Project Director of the Demographic Surveillance System of Matlab. Dr. van Ginneken is on secondment from the Government of the Netherlands. He is a noted demographer and epidemiologist. Prior to joining the Centre Dr. van Ginneken has served with the Netherlands Interdisciplinary Demographic Institute as Senior Researcher. **Dr. Henry Baker Perry III** (USA) joined the Urban MCH-FP Extension Project as the MCH-FP Programme Scientist in January. Dr. Perry is on secondment from the Johns Hopkins University. Dr. Perry holds an M.D. and a Ph.D. in Behavioural Sciences, and has long experience in health programme development, evaluation, and quality improvement. **Dr. Aye Aye Thwin** (USA) joined the Centre in February as Operations Research Scientist for the Urban MCH-FP Extension Project. Dr. Thwin is an M.D. and has a Doctor of Public Health degree. She has had several years of involvement in family planning operations research in Bangladesh. Prior to her joining the Centre she worked with the "German Technical Assistance" (GTZ) as Advisor to the National Institute for Population Research and Training, Dhaka. **Ms. Sarah Salway** (UK) joined the Centre as an International Fellow in the Urban MCHFP Extension Project on secondment from the London School of

Hygiene & Tropical Medicine for one year. Ms. Salway was earlier on secondment as Research Investigator to the same project. **Dr. Mizanur Rahman** (Bangladesh), a former National Officer category staff and a consultant to the Rural MCH-FP Extension Project, was offered an International Professional position as Demographer in April. **Dr. Ann Levin** (USA) joined the MCH-FP Extension Project as the Health Economist/Cost Analyst in July. Prior to joining the Centre, she was a Lecturer at the University of Ghana Regional Institute of Population Studies. **Dr. Helen Wirzba** (France) joined as a short-term staff member in the Rural MCH-FP Extension Project in February. Dr. Wirzba was with the Centre for a short period in the early part of 1994 as a Consultant to the same project. **Dr. Ursula von Gierke** (Germany) joined the Centre in March as an International Research Fellow in the Clinical Sciences Division for one year. Prior to her joining the Centre, Dr. von Gierke worked in the Division of Internal Medicine of the General Hospital Munchenschwabing, Germany. She has experience and expertise in HIV infection and AIDS. **Dr. Telahun Teka** (Ethiopia) Associate Professor, Department of Paediatrics of the Gondar College of Medical Sciences, Gondar, joined the Clinical Sciences Division in September as an International Research Fellow under the Health Research Training Programme.

### Consultants

During the year, the following consultants were invited to assist in different projects/programmes:

**Dr. Alayne Mary Adams** (USA) was invited in March for 15 days to provide technical assistance to the BRAC-ICDDR,B Project. **Mrs. Jan Bell** (Australia), from the Monash Medical Centre, Melbourne, Australia, provided consultancy in August on "Surveillance and associated studies of antimicrobial resistance of *Streptococcus pneumoniae* and *Haemophilus influenzae* in children" in the Laboratory Sciences Division. **Dr. Stephen P. Borgatti** (USA) served in May for two weeks conducting an intensive workshop on network analysis and software applications. **Ms. Sarah Coghlan** (USA) provided consultancy services from February to April as Editor of the 1994 Annual Report. **Dr. Roger I. Glass** (USA) was invited for two weeks in February to formulate the research agenda for the virology group in the Laboratory Sciences Division. **Mr. Joel Hunt** (Australia) was invited for one week to

fumigate and test nine biohazard/laminar flow cabinets in the Laboratory Sciences Division. **Mr. Zahid Iqbal** (USA) was again invited by the Centre to provide consultancy services to the Centre for editing scientific papers, project proposals, etc. and editing and designing the 1995 Annual Report. **Dr. Diana (Dee) Jean Jupp** (UK) provided consultancy for four months for the AIDSCAP Workshop in the Community Health Division. **Dr. M. Mazharul Islam** (Bangladesh), Associate Professor, Department of Statistics at the University of Dhaka, was appointed for two months to develop a questionnaire, sampling design, and a report of the Population Studies Centre. **Dr. Moral Nazrul Islam** (Bangladesh) served again this year as a consultant for the Bangla newsletter Shasthya Sanglap. **Dr. Daniel Wouter Mulder** (The Netherlands) visited the Centre for a brief consultancy in April to promote support to the Director's Bureau in the field of epidemiological research. **Dr. Paul E. Kilgore** (USA) visited the Laboratory Sciences Division for two months for a survey of neonatal rotavirus infections. **Mr. Anthony Shillingford** (UK), volunteer from the British Executive Services Overseas, visited the Centre to undertake a cost and management review of the Dhaka and Matlab hospitals. **Mr. T. Sykes** (UK) visited the Centre for two months to develop diagnostic microbiology services for STDs and RTIs for the RTI project, and also to train a microbiologist. **Mr. M. Yahiya** (Bangladesh) came in February for 15 days to review the activities of the Chakaria Community Health Project activities and to make recommendations for future directions.

#### **The following experts were invited on Contractual Service Agreements during the year:**

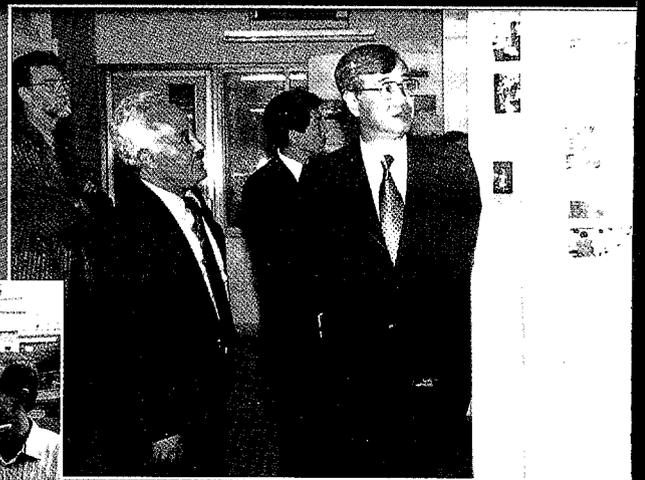
**Ms. Nancy Fronczak** (USA) recruited for five months to the Urban MCH-FP Extension Project to work as Principal Investigator on "Maternal morbidity and choice of delivery care provider in the urban slums of Dhaka." **Dr. Karen B. Allen** (USA) recruited for nine months to assist the Director, Population Studies Centre, in carrying out the evaluation of the Bangladesh Demographic and Health Survey within the Matlab DSS.

#### **Visitors**

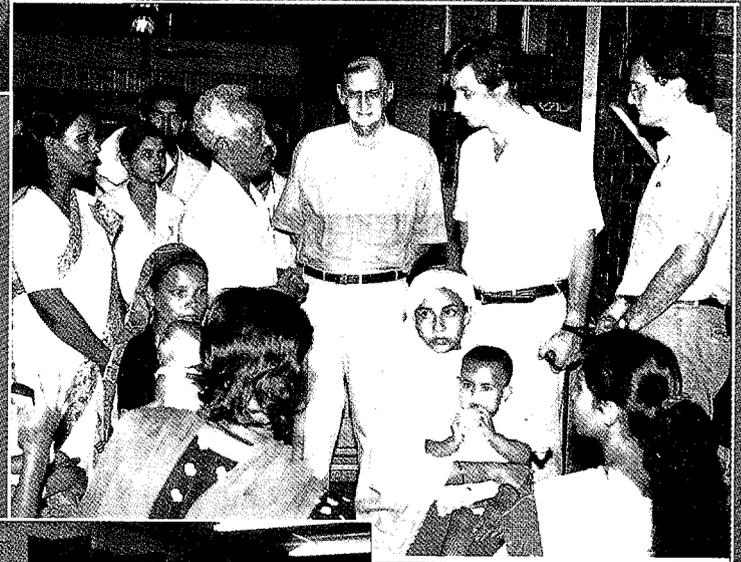
The following are only some of the many distinguished visitors who came to observe the activities of the Centre:

**AIDSCAP, Asia Regional Office:** Dr. Neil R. Brenden, Director; **Australian High Commission, Dhaka:** H.E. Mr. Kenneth W. Aspinall, High Commissioner; **Belgium:** His Royal Highness Prince Philippe, Crown Prince of Belgium; **Boston University, Centre for International Health:** Dr. William J. Bicknell, Director; **Canadian High Commission, Dhaka:** H.E. Mr. Jon J. Scott, High Commissioner; **Canadian International Development Agency (CIDA):** Ms. Huguette Labelle, President, and Mr. Jean-Marc Metivier, Vice President, Asia Branch; **Centers for Disease Control and Prevention, Atlanta, Georgia, USA:** Dr. Les Roberts, National Center for Environmental Health, and Dr. Roger I. Glass, Chief, Viral Gastroenteritis Unit, National Center for Infectious Diseases; **Child Health Foundation, Columbia, MD, USA:** Mr. Robert Smith, Fundraiser; **Chulalongkorn University, College of Public Health, Thailand:** Prof. Chitr Sitti-amorn, Dean; **CNBC Business News, USA:** Ms. Susan Lisovicz, Correspondent; **College of General Practitioners, Sri Lanka:** Dr. B. Desmond J.S. Fernando, President; **Department of State, USA:** Ms. Robin L. Raphel, Assistant Secretary of State for South Asia; **East-West Population Center, USA:** Prof. Andrew Kantner; **Embassy of Belgium, Dhaka:** H.E. Mr. Xavier van Migem, Ambassador; **Embassy of Japan, Dhaka:** H.E. Mr. Yoshikazu Kaneko, Ambassador, and Mr. Yoshihisa Kuroda, Charge d'Affaires; **Embassy of the Russian Federation in Bangladesh, Dhaka:** Mr. Youri I. Roundnev, Counsellor; **Embassy of Sweden, Dhaka:** Ms. Britt F. Hagstrom, Counsellor and Head, Development Cooperation; **Emory University, The Rollins School of Public Health, Department of International Health, USA:** Dr. Stanley O. Foster; **European Union, Dhaka:** Mr. Anthony Goodwin, Counsellor; **Family Planning Association of Nepal:** Mr. Ram K. Neupane, Director General, and Mr. Sunil Kumar Bhandari, President; **Family Planning Association of Pakistan:** Mr. Mian Abdul Hameed, Director General (Field Operations); **Family Planning Directorate, Mexico, D.F.:** Dr. Ramon Aznar Ramos, Director of Coordination; **The Ford Foundation, Dhaka:** Mr. Raymond Offenheiser, Representative, and Ms. Gabrielle Ross, Assistant Programme Officer; **The Ford Foundation, New York:** Dr. Jose Barzelatto, Director, Reproductive Health Programme; **Government of Bangladesh:** Mr. Kamal Ibne Yusuf, Minister, Health and Family Welfare; Mr. M. Saifur Rahman, Minister of Finance, and Mrs.

*Visitors  
from near and far...*



*at the Centre's hospital ...*



*and at the Centre's creche!*



Sarwari Rahman, State Minister for Women and Children's Affairs; **Government of Ethiopia. Ministry of Health:** Mr. Yohanes Tadese, Head, Family Planning Team; **Government of India. Ministry of Health & Family Welfare:** Mr. Indrajit Pal, Director (Policy), and Mr. P.K. Sivanandan, Joint Secretary cum Mission Director, Ministry of Rural Development; **Government of Japan. Ministry of Foreign Affairs. Economic Cooperation Bureau:** Mr. Kazuo Watanabe, Director, Research & Programming Division; **Government of Nepal. National Planning Commission:** Dr. P.L. Joshi, Adviser, Population Division; **Government of Uganda. Ministry of Health:** Dr. N. Kenya-Mugisha, Programme Manager, CDD/ARI; **The Harvard Center for Population and Development Studies, USA:** Dr. Alayne M. Adams; **High Commission of the Democratic Republic of Sri Lanka, Dhaka:** H.E. Mr. S.B. Atugoda, High Commissioner; **Institute of Public Health, Medical Research Council, UK:** Dr. Sheila M. Gore, Biostatistics Unit; **The International HIV/AIDS Alliance, UK:** Mr. Jeffrey O'Malley, Executive Director; **The Johns Hopkins University. Department of Population Dynamics:** Prof. W. Henry Mosley; School of Hygiene and Public Health, Faculty of Medicine: Dr. Robert E. Black, Professor and Chairman, and Prof. Kenneth Hill; Department of International Health: Dr. R. Bradley Sack, and Dr. Mathuram Santosham; Division of Geriatric Medicine: Prof. William B. Greenough III; **Johnson Wax, Wisconsin, USA:** Ms. Patricia Hamilton, Director of Communications; **Kantonsspital, Basel, Switzerland:** Prof. Klaus Gyr; **London School of Hygiene & Tropical Medicine. Centre for Population Studies:** Prof. John Cleland; Department of Maternal and Child Epidemiology Unit (MCEU): Dr. Carine Ronsmans; Department of Epidemiology and Population Sciences: Dr. David A. Ross, Senior Lecturer in Epidemiology; Tropical Health Epidemiology Unit: Dr. Daan W. Mulder; Mali: Madam Adam ba Konare, First Lady of Mali; **The National Computing Centre Limited, UK:** Mr. Brian Holbrook, Senior Consultant; **National Institutes of Health, Bethesda, MD, USA:** Dr. John D. Clemens, Chief, Epidemiology Branch; **Research Institute for Tropical Medicine, Philippines:** Dr. Mary Ann Lansang, Deputy Director; **The Rockefeller Foundation, New York, USA:** Dr. Steven W. Sinding, Director, Population Sciences Division; and Dr. Sara E.

Seims, Associate Director; **The Royal Norwegian Embassy, Dhaka:** Ms. Brit Faurby, Charge d'Affaires; **Sapporo Medical College, Japan:** Prof. Shozo Urasawa, Department of Hygiene and Epidemiology; **Dr. John Stoeckel, Private Consultant, Bangkok, Thailand;** **Swedish International Development Agency (SIDA), Sweden.** Department of Research Cooperation: Ms Hellen Ohlin, Research Officer, Health and Nutrition; **Swiss Development Cooperation, Embassy of Switzerland, Dhaka:** Dr. Walter Meyer, First Secretary (Development Cooperation); **Swiss Red Cross International Cooperation:** Mr. Claude-Andre Ribaux, Head, Asia and Europe Division; **Tufts University, School of Medicine. Department of Paediatrics and Medicine:** Dr. Michael Bennish, Associate Professor; **United Nations Population Fund (UNFPA), Dhaka:** Dr. Alain B. Mouchiroud, Country Director; **Universidad Central de Venezuela. Department of Anthropology:** Dr. Charles L. Briggs; **The University of Alabama at Birmingham, USA. School of Public Health:** Prof. Jose O. Alvarez, Chairman, Department of International Health; and Prof. Sten Vermund, Department of Epidemiology; **The University of Calgary, Canada. Faculty of Medicine:** Dr. J. Decker Butzner, Associate Professor of Paediatrics; **University of Connecticut, USA:** Dr. Pertti Pelto, Professor Emeritus, Anthropology; **The University of Edinburgh, U.K. Department of Child Life and Health:** Dr. William A.M. Cutting; **University of Minnesota, USA:** Dr. Norbert Hirschhorn; **University of North Carolina, USA:** Dr. Marc Rhoads, Paediatric Gastroenterologist; **University of Pennsylvania, USA:** Prof. Jane Menken, Director, Population Studies Center; **US Agency for International Development, Dhaka:** Mr. Richard M. Brown, Mission Director; and Mr. David L. Piet, Director, Office of Health & Population; **Office of Foreign Disaster Assistance, USAID, Manila:** Dr. Tom Brennan, Regional Adviser; **US Agency for International Development, Washington, D.C.:** Ms. Carol Lancaster, Deputy Administrator, and Dr. Caryn Miller; **Embassy of the United States, Dhaka:** H.E. Mr. David N. Merrill, Ambassador; **Vietnam Family Planning Association:** Mrs. Ta Thi Tuyet Van, Head, Programme and Operations Unit; and from **The White House, Washington, D.C.:** Mrs. Hillary Rodham Clinton, First Lady of the United States of America and Ms. Chelsea Clinton, her daughter.

## **A&P** Retirements

The following six staff members retired from the Centre during the year:

**Mr. Abdul Mannan Howlader**, Ward Attendant, CRSC, CSD; **Mr. Omar Ali Miah**, Senior Laboratory Attendant, LSD; **Mr. Md. Mohiuddin**, Laboratory Technician, Pathology Laboratory, LSD; **Mrs. Shushama Pashi**, Research Officer, Immunology, LSD; **Mr. John Cicil Sikder**, Aid Nurse, CRSC, CSD; **Mr. Md. Abdus Sobhan**, Speedboat Driver, MH&RC, CHD.

### Separation by Mutual Agreement

Nine staff members who sought separation by mutual agreement were released during the year.

Mrs. Raushan Akhter, Clerk, Gr-I, DISC, Director's Bureau; Mr. Rajab Ali, Field Research Officer, MH&RC, CHD; Mr. Md. Shohrab Uddin Bhuiyan, Driver, LS&FS, A&P; Mrs. Nazma Dey, Assistant Medical Illustrator, Audio Visual Unit, Director's Bureau; Mrs. Rumi Gomes, Aid Nurse, CRSC, CSD; Mr. Md. Zainnal Abedin Khan, Senior Laboratory Attendant, LSD; Mr. Md. Lal Miah, Cleaner, GSU, A&P; Mr. Md. Khabir Hossain Mollah, Cleaner, GSU, A&P; Mr. Nicholas Rozario, Laboratory Technician, LSD.

## Long Service Award: **25** Years

During 1995, thirteen General Services staff members who completed 25 years of service at the Centre were awarded meritorious increases in pay:

**Mr. Md. Akhteruddin Ahmed**, Tailor, CRSC, CSD; **Mr. Jainal Abedin**, Nursing Attendant, DTC, Matlab, CHD; **Mr. Md. Jalal Ahmed**, Dispatcher, Matlab Administration, CHD; **Mr. Osman Ali**, Laundry Operator, CRSC, CSD; **Mr. Azizul Hoque Bhuiyan**, Senior Laboratory Technician, Clinical Biochemistry, LSD; **Mr. Abul Hashem**, Speedboat Driver, Matlab Administration, CHD; **Mr. Md. Abul Hossain**, Assistant Staff Nurse, CRSC, CSD; **Mrs. Jahanara Khayer**, Nursing Attendant, DTC, Matlab, CHD; **Mr. Nashu Miah**, Cleaner, GSU, A&P; **Mr. Shaikh Noor Mohammad**, Security Guard, GSU, A&P; **Mr. Md. Nazimuddin**, Speedboat Driver, Matlab Administration, CHD; **Mr. Shaikh Abdus Samad**, Security Guard, GSU, A&P; **Mr. Md. Waliullah**, Cabinet Maker, Engineering & Maintenance, A&P.

## Long Service Award: **30** years

During 1995, seven staff members who completed 30 years of service in the Centre were awarded meritorious increases in pay:

**Mr. Md. Ali**, Senior Laboratory Attendant, LSD; **Mr. Ruhul Amin**, Health Assistant, MH&RC, CHD; **Mr. Md. A. Basher Bhuiya**, Mechanic, Engineering & Maintenance, A&P; **Mr. Osman Ghani Bhuiyan**, Senior Health Assistant, DTC, MH&RC; **Mr. Md. Abul Kashem**, Health Assistant, Matlab DSS, PFPD; **Mr. Nurezzaman**, Foreman Plumber Steam Fitter, Engineering & Maintenance, A&P; and **Mr. Siddiqur Rahman**, Senior Health Assistant, Special Studies, CHD.

## Obituaries

**With deep sorrow we record the deaths of the following staff members who served the Centre for many years:**

### **Dr. Asma Khanam (47)**

Scientist, Clinical Research and Service Centre. Dr. Khanam served the Centre for almost 19 years.

### **Mrs. Nazma Akhter (37)**

Interviewer, MCH-FP Extension Project (Urban). She served the Centre for more than eight years.

## Scientific Ranking

The following staff members were awarded promotions through the scientific ranking process in recognition of their merit and scientific achievement:

**Dr. Firdausi Qadri**, to Senior Scientist, LSD;  
**Dr. Tasnim Azim**, to Associate Scientist, LSD;  
**Dr. Rashidul Haque**, to Associate Scientist, LSD;  
**Dr. Jena D. Hamadani**, to Senior Medical Officer, Gr-II, CRSC, CSD.

### Staff Clinic

Physician Manager: Matiur Rahman

During 1995, the Staff Clinic provided improved health care facilities to staff members and their dependents. In addition, the Clinic conducted 15 health education seminars to create increased health awareness among the staff members and their dependents.

### Procurement Branch

Procurement Manager: Mahbubul Alam  
Manager Purchase: Omar Reza Abdullah

During the year, the Branch procured materials worth US \$ 920,320 through local procurement and US \$ 2,422,685 through overseas procurement.

### Administration Branch

This branch is made up of the Estate and Travel offices.

#### Estate Office

Senior Estate Officer: Mujibur Rahman

#### Travel Office

Manager, Travel Services: Kh. Shafiqul Hossain

### Engineering Branch

Engineering Manager: Taqsem A. Khan

The Engineering Branch supports and maintains the physical facilities of the Centre. It supervises and coordinates security and cleaning services, transport and logistics support, vehicle maintenance, and the Staff Canteen.

The Branch is made up of the following sections:

#### Civil Engineering

Assistant Engineer: Rabindra Das

#### Electrical Engineering

Supervisor: Azizul Hoque

#### Vehicle Maintenance

Assistant Engineer: M.A.H. Talukder

#### General Services

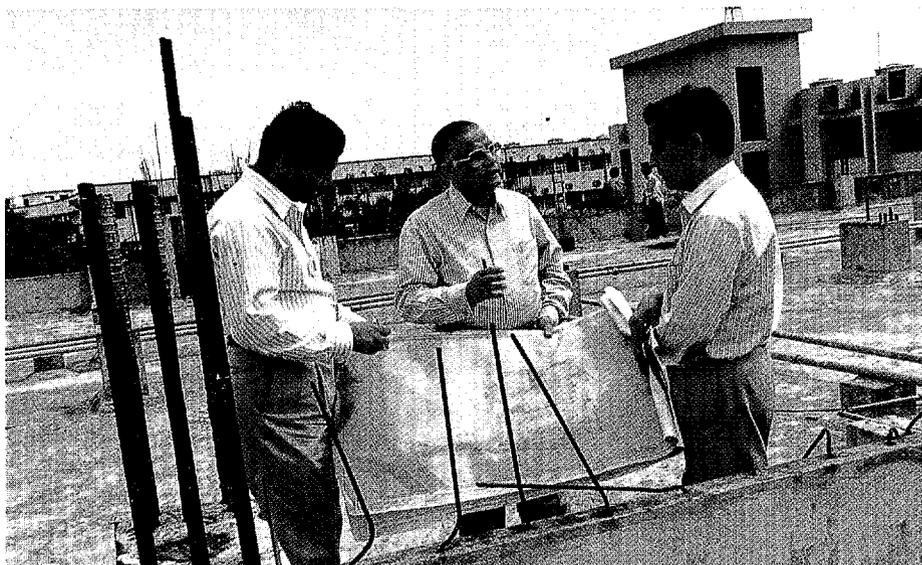
General Services Officer: A.M. Alamgir

#### Transport Management

Transport Officer: Md. Hamidullah

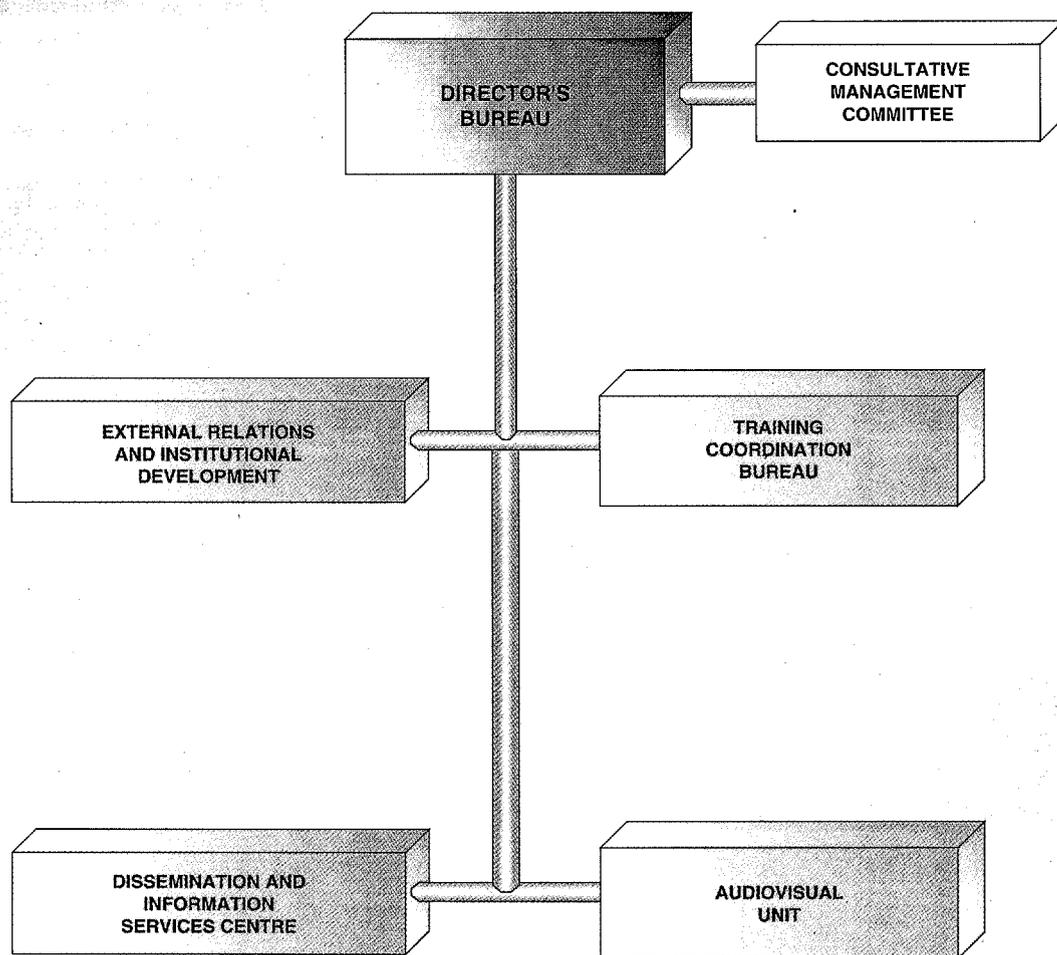
#### Staff Canteen

Supervisor: Md. Abdullah



*Planning the development of the Centre's physical facilities is a challenging process.*

## 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 optimize communication, dissemination and information exchange.

The External Relations and Institutional Development office is charged with coordinating fundraising efforts, corporate communication, organizational planning and development, and grant management. The Training Coordination Bureau 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 Ethics Experimentation committees.

### External Relations and Institutional Development

Assistant Director: Graham A.N. Wright

The External Relations and Institutional Development (ER&ID) office continued its efforts to implement the Resource Development Strategy, raise the Centre's international profile and further improve the management systems. Activities continued in both Bangladesh and North America.

### Activities in Bangladesh

Core/institutional funding increased by \$239,952 (6%), and project funding increased by \$1,406,364 (22%) in 1995.

The increase in institutional funding was largely due to the tremendous support that the Centre received from the **Government of Bangladesh**, which raised its annual contribution and gave an additional ad hoc contribution of 500,000. These donations, which clearly demonstrate the close working relationship between the Centre and the host country Government, made Bangladesh the second largest donor to the Centre in 1995.

**AusAID** and **BADC** provided assistance to enlarge the Community Health Division offices, while **BADC** maintained its regular support and the five experts seconded to the Centre. After the visit of its President, **CIDA** increased its funding back above the 1994 level, and **The Netherlands** has added to its ongoing institutional funding by financing the secondment of a scientist to head the Demographic Surveillance System

(DSS). The Kingdom of Saudi Arabia maintained its support. The Centre's 1994 and 1995 proposals to the **Arab Gulf Fund** remain unfunded.

Project funding was received from over 30 different sources. **AusAID** and **Japan** continued to support the Centre's reproductive health and family planning work in Matlab, and **Japan** continued its support for training and project work in the Clinical and Laboratory Sciences Divisions.

These Divisions have also been undertaking work funded under the **European Union's** DG12 "Life Sciences and Technologies for Developing Countries" mechanism, in conjunction with universities in Germany, Spain, Sweden, and the UK.

The **Child Health Foundation** secured a grant from the **American Express Corporation** for training of nurses, as well as providing in-kind support. The **Ford Foundation** made a supplementary grant in support of HIV/AIDS work at the Centre, and the **Rockefeller Foundation** provided funds for studies on the Grameen Bank and the onset of fertility decline in Bangladesh.

A grant from the **US National Institute on Ageing** through the RAND Corporation has allowed the initiation of a large-scale project using the **DSS**. **UNICEF** supported some of the work on low osmolarity Oral Rehydration Solution (ORS), and the **Overseas Development Assistance**, UK (ODA) agreed to strengthen health economics at the Centre through a three-year grant. In a move that was not altogether a surprise, **USAID** reduced its targeted research funding for 1995,

but increased funding for applied water and sanitation and vitamin A work. Finally, following the problems in Goma, the US Office of Foreign Disaster Assistance funded a pilot training programme to improve the management of epidemics during emergencies.

In addition, in response to the post-flood epidemic in the hospital, proposals were prepared and sent out to nearly 20 different donors in Dhaka, generating over \$312,000 in additional funds to help meet this extraordinary need. The Norwegian Government was particularly generous in its response for both preventive and curative components of the Centre's programme. Other donors included AusAID, Bangladesh, CIDA, DANIDA, Germany, Netherlands, SIDA, and ODA.

Some new or "returning" donors who funded in 1995 included the Aga Khan Foundation (returning after a break of several years), British Executive Services Overseas (who provided an expert to review the management of the hospitals), Germany (which gave cash support for the post-flood epidemic response), Sri Lanka (which made an important grant for institutional funding), Thailand (which gave support for computer training), and the World Bank/WHO (which is supporting ARI-related work).



*Ms. Berit Fladby, Charge d' Affaires at the Norwegian Embassy in Dhaka visited the hospital in August. The Norwegian Government was particularly generous in its funding of the Centre's epidemic response efforts.*

The ER&ID office has been busy coordinating the preparation of important large-scale project proposals that, if funded, could provide important stability to the Centre and thus allow improved research planning and management.

Several large project proposals were submitted for funding: **European Union** (the five-year Bangladesh Health Action Research Project); **Japan** (the five-year International Family Planning Training Programme, plus the Matlab Training Centre construction, and the Dhaka Family Planning Centre construction); **ODA/Thailand** (computer systems training and consultancy); **USAID/Washington** (a five-year cooperative agreement for institutional development and targeted research).



*H.E. Mr. Abdullah Omar Barry, Ambassador of the Kingdom of Saudi Arabia, hands a cheque to Director Dr. Demissie Habte in the offices of the Embassy in Dhaka.*

To foster Principal Investigators' abilities to prepare project proposals, a new internal competitive grants award system has been developed to allocate the SDC and USAID/Washington research grants.

Considerable effort was put into planning the next phase of the **Hospital Endowment Fund** activities. Maj. Gen. (Retd.) M.R. Choudhury kindly consented to chair the Hospital Endowment Committee, with Mr. M.A. Mahbub, Division Director, A&P as vice-chairman. The Committee completed a series of preparatory meetings, made progress in appointing members to the Council of Investment Advisors and the Council of Goodwill Ambassadors, drafting a Case Statement for the campaign, and examining new and alternative approaches to involving the community in Bangladesh in the campaign.

Ms. Susan Lisovicz (a journalist with NBC) and Ms. Pat Hamilton (director of employee communications with Johnson Wax, USA) volunteered to review, in Dhaka, the Centre's activities and its communication strategy, and made several important recommendations for improvements. The new look of Glimpse is, in part, a result of these efforts.



The ER&ID Office coordinated the visits of Mrs. Hillary Rodham Clinton; Carol Lancaster (Deputy Administrator USAID); Ms. Robin Raphael (US Assistant Secretary of State for South Asia); Ms. Huguette Labelle (President CIDA); Hon. Ministers of Finance, Health and Family Welfare, and Women and Children's Affairs; Crown Prince Philippe of Belgium; Mrs Adam BA Konare (wife of the President of Mali); H.E. Mr. Atugoda, (Sri Lankan High Commissioner to Bangladesh); and many others.

A media-blitz accompanied the visit of Mrs. Hillary Rodham Clinton, and press releases, press packs and photographs were prepared for and distributed to the 16-member pool of US journalists travelling with Mrs. Clinton, and the 16-member pool of Bangladeshi journalists covering her visit.

Continued guidance was provided to PIs for understanding the terms and conditions and for managing their grants. A database system was designed to ensure the timely production and submission of reports required under ongoing grant agreements.

### Activities in North America

The Centre's team in North America operates out of the Child Health Foundation (CHF) and has made good progress towards the development of a signifi-

cant base for The Centre Fund endowment. The priorities for The Centre Fund Campaign staff in the United States have been as follows:

- \* to obtain a leadership-level gift from USAID;
- \* to build foundation and corporate support;
- \* to recruit a Centre Fund Volunteer Committee;
- \* to maintain and build linkages with the U.S. and international institutions; and
- \* to build a constituency for the Centre in the U.S., particularly among the Centre's alumni, the Bangladeshi community, and U.S. government leaders.

The results of these efforts are quite encouraging:

- \* USAID has, in principle, agreed to provide \$1 million for the endowment.
- \* The Ford Foundation has, in principle, agreed to provide \$1 million, with another \$1 million in prospect.
- \* The Rockefeller Foundation has committed a gift of \$150,000 in unrestricted funds.

There has been good progress in recruiting The Centre Fund Volunteer Committee, and the following persons have agreed to serve:

- Mr. Azmat Ali,  
Chairman and CEO, NYM Aerospace, USA;
- Dr. John Evans,  
Chairman, Rockefeller Foundation;
- Dr. William B. Greenough III,  
Johns Hopkins University (ex officio);
- Dr. Demissie Habte,  
ICDDR,B (ex officio);
- Dr. D.A. Henderson,  
Johns Hopkins University;
- Dr. Joshua Lederberg,  
President Emeritus, Rockefeller University;
- Mr. A.K.M. Shamsuddin,  
Managing Director, Rhone-Poulenc Bangladesh;
- Mr. Abu Solaiman,  
President, Data Flow Corporation, USA.

## Contributions on a Revenue-Earned basis from 1990-95 in US\$

	<u>1995</u>	<u>1994</u>	<u>1993</u>	<u>1992</u>	<u>1991</u>	<u>1990</u>
<b>Revenue Contributions</b>	<b>12,114,554</b>	<b>10,468,238</b>	<b>10,170,494</b>	<b>9,527,010</b>	<b>10,348,920</b>	<b>8,921,663</b>
AMEX Foundation via CHF	41,083					
Arab Gulf Fund	(150,000)	250,000	250,000	350,000		
Asian Development Bank	22,149	32,851				
Australia - AusAID	310,805	299,256	210,980	234,417	232,061	216,139
Bangladesh	445,092	187,500	113,849	26,251	26,170	27,695
Bayer Ag	9,136	72,866	73,159	19,068	23,218	74,760
Belgium - BADC	391,372	341,182	279,998	324,348	409,904	288,992
Canada - CIDA	510,256	353,761	800,000	856,621	885,943	213,022
Denmark - Danida		88,658	186,671	239,095	205,896	169,641
European Union	146,860	2,564	3,301			
Ford Foundation	369,238	270,347	302,022	148,669	51,715	113,227
IDRC	59,272	90,000	88,825	64,174	70,174	51,731
Japan	702,846	683,691	367,009	454,817	434,807	387,000
Johns Hopkins University	26,546	64,503	22			
Netherlands	720,913	453,850		149,385	336,238	764,790
New England Medical Center	51,773					
Norway - NORAD	164,075	122,004	133,961	97,000	310,562	326,641
Rand Corporation	38,301				8,000	
Rockefeller Foundation	20	29,693	39,155	15,360		
Saudi Arabia	59,198	58,000	57,696	58,636	57,275	
Sweden - SAREC	511,174	528,174	383,460	385,655	340,165	121,491
Switzerland - SDC	1,302,562	1,419,976	1,266,215	1,340,475	1,785,342	1,145,633
- Red Cross	210,453	147,821				
United Kingdom - ODA	618,043	488,022	417,395	291,706	277,534	397,434
United States - USAID etc.	4,283,686	3,549,801	3,518,971	3,422,666	3,004,837	3,251,195
UNDP			(7,300)	150,178	19,062	
UNDP/WHO	350,000	350,000	350,002	307,613	337,844	163,752
UNFPA	131,269	123,753	223,713	91,243		
UNICEF	312,246	305,554	301,314	324,308	325,829	252,538
University of Alabama	30,542					
Wander Ag.	32,434	1,250				
WHO	36,889	53,579	76,861	64,163	88,388	166,428
WUSC					801,673	741,914
Others	88,470	99,582	130,371	65,758	86,726	47,640
Disaster Relief	287,851		602,844	45,404	229,557	
<b>Capital Contributions</b>	<b>281,887</b>	<b>0</b>	<b>400,000</b>	<b>1,435,480</b>	<b>330,568</b>	<b>48,788</b>
Australia - AusAID	30,887					
Bangladesh	251,000			1,135,480		
Sasakawa Foundation			400,000	300,000	300,000	
UNCDF					30,568	48,788

Contributions in 1995 from Others were received from Aga Khan Foundation, CARE, East West Inc, Family Health International, Helen Keller International, International Atomic Energy Center, Macro International, Population Council, Procter & Gamble (via CHF), Sight and Life, Smith Kline French, Social Development Center, Sri Lanka, University of California, University of Edinburgh and University of Iowa.

During 1995 contributions in kind were received from Bangladesh, Belgium, British Executive Services Overseas, Child Health Foundation (CHF), Commonwealth Secretariat, Federal Republic of Germany, The Ford Foundation, The Netherlands and The Population Council.

## Individuals

Mr. Md. Zafar Amin  
Ms. Loretta Saldanha-Ansari  
Dr. & Mrs. Peter Arnold  
Dr. R. Bairagi  
Prof. J.E. Banatvala  
Prof. Barkat-e-Khuda  
Dr. Graeme Barnes  
Ms. Saleha Begum  
Dr. J.D. Butzner  
Dr. O. Fontaine  
Dr. Sheila Gore  
Prof. L. Fernaud  
Dr. Laura Gibney  
Dr. & Mrs. J.R. Hamilton  
Dr. R.H. Henderson  
Prof. Fehmida Jalil  
Mr. Elthem Kabir  
Dr. Kalharin  
Mr. Md. Kutubuddin  
Mr. Abdul Aziz Mainary  
Mr. J.O. Martin  
Dr. J.P. Muliyl  
Mr. Roga Rodach  
Dr. J.E. Rohde  
Mr. Sadaruddin Bande Ali  
Mr. Kenneth J.J. Tipping  
Prof. James L. Wescoat  
Mr. Graham A.N. Wright

Through

## Child Health Foundation

Mr. Azmat Ali  
Ms. Gabriella Bonert  
Mr. David Buchanan  
Ms. Judy Crickard  
Ms. Patricia Hamilton  
Dr. Maureen Law  
Mr. & Mrs. Carl A. Miller  
Mrs. Charlene Dale Riikonen  
Dr. & Mrs. David Sacher  
Dr. & Mrs. R.B. Sack  
Ms. Beth Savage  
Ms. Debbie Truckey  
Ms. Laurie Velicer

*[The Board of Trustees of the Child Health Foundation (CHF) voted in 1991 to accept contributions on behalf of ICDDR,B from US residents, thereby providing the donor a tax credit. CHF is an action agency whose mission is to support the development of practical, low-cost methods to prevent and treat the most common afflictions of children of under-served areas of the United States and developing countries in all parts of the world. Donations to ICDDR,B's Hospital Endowment Fund can be made through the Child Health Foundation, 10630 Little Patuxent Parkway, Century Plaza, Suite 325, Columbia, MD 21044, USA..]*

# Hospital Endowment Fund Contributions 1995

## Foundations, Trusts, Agencies

Al-Falah Agency  
Beximco Pharmaceuticals Ltd.  
Child Health Foundation  
Dynamic Textile Industry Ltd.  
Ganges Travel Service  
ICDDR,B Employees' Multipurpose  
Cooperative Society Ltd.  
KSF-Fibres  
Meghna Cement Co. Ltd.  
Mirpur Ceramic Works  
Mita Textile Ltd.  
National Warehouse Ltd.  
Orion Infusion Ltd.  
Reliance Insurance Co. Ltd.  
SABINCO  
Scobie & Claire Mackinnon Trust  
Swiss Development Cooperation  
United Insurance Co. Ltd.  
Uttara Motors  
Zonta Dhaka Club-III

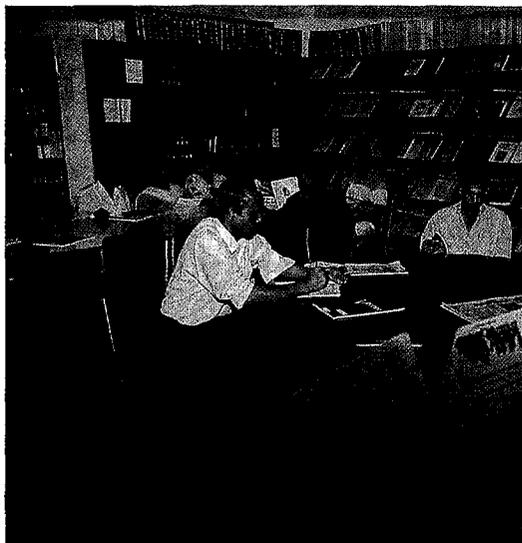
## Gifts and Prizes

Accsees Computer Ltd.  
ANZ Grindlays Bank  
Bengal Ceramics  
British Air  
KLM (Royal Dutch Airlines)  
National Warehouse Ltd.  
Nita Company (Nitol Motors)  
Thai International Airways

## Sale Proceeds and Misc.

### Sources

Fundraising dinner  
Interest income  
Investment income  
Matlab book



*The Periodicals Room is a popular spot for Centre scientists and staff, and many outside users as well. Over 400 current journals are available in the Library.*

### **Dissemination and Information Services Centre**

Head: M. Shamsul Islam Khan

The Dissemination and Information Services Centre (DISC) supports the Centre's activities and programmes through its information and publications services.

The provision of library-based information services includes an extensive journal collection, a lendingbook collection, major reference sources, an interlibrary loan service, departmental book collection, and reference and bibliographic services, literature searches, and current awareness assistance. The publication service includes a quarterly journal of international repute, a bibliography (within the journal), two newsletters, a news bulletin, an annual report, and occasional scientific and special publications.

DISC was connected with the E-mailing system in 1995, which has facilitated communication with international organizations and institutions.

Major activities performed during 1995 are highlighted below:

□ About 575 of the Centre's staff and visitors, and 6,234 researchers, health professionals, teachers, and students from different organizations, used the library

collection, facilities and services. DISC received 392 current journals (254 on subscription) and 5 databases (Medline, Popline, AIDS, DEVINSA, and Current Contents: Life Sciences).

□ DISC's own databases created for the journal and book collections, periodical articles, and research projects were further expanded.

□ The library's borrowing facilities were available for the staff of the Centre's and of the Institute of Public Health as well as to other libraries under the provision of interlibrary loan arrangements.

### **Information Dissemination**

□ 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.

□ The publication schedule of the Journal of Diarrhoeal Diseases Research (JDDR) was maintained. The former Director of the Centre, Prof. Roger Eeckels, replaced Dr. Dilip Mahalanabis as the JDDR Editor-in-Chief.

□ Six issues of the bimonthly newsletter Glimpse, with a target audience of more than 3,700 in 112 countries, were published. Glimpse highlights the Centre's research and training activities, and disseminates information on scientific findings published by the staff.

□ Four issues of the newsletter in Bengali, Shasthya Sanglap (Dialogue on Health), were published. This quarterly newsletter is published (25,000 copies per issue) for front-line health professionals to create awareness of basic health problems (with an emphasis on primary health care).

□ Five issues of the inhouse bilingual bimonthly newsletter, ICDDR,B News, were published.

□ In addition to the above, DISC published the Centre's Annual Report 1994, two working papers, six special publications, and two scientific reports.

Under the national collaboration programme, a total of 575 duplicate journal issues were offered to health libraries in the country. A Graduate Tutor from the Independent University Bangladesh and a Master's Degree student of the Department of Library and

Information Science, University of Dhaka, received, respectively, one-month and three-month training in information management at the Centre's library.

In addition, eight 3rd year Honours Course students of the Department of Library and Information Science, University of Dhaka, attended a 15-day internship programme at the library.

In January, DISC participated in the Dhaka Book Fair-1995 and displayed the Centre's publications. The Head of DISC attended the COMLIS-IV (Congress of Muslim Librarians and Information Scientists) held in Teheran in June, and the Second AHEAD's (Asian Health, Environmental & Allied Databases) Board of Directors' meeting held in Bangkok in August.

Mr. Md. Nazimuddin, Librarian, and Mr. M. Mahfuzul Hassan, Senior Secretary, attended an 8-day Regional Workshop Programme on CD-ROM, held in New Delhi in August. Mr. Mir Motasem Ali, Serials Librarian and Mr. Md. Nazimuddin, Librarian, attended a 3-day Workshop on Effective Poptline Implementation, held in Dhaka in April, organized by the Center for Communications Program, The Johns Hopkins University, USA.

### Audio Visual Unit

Head: Asem Ansari

The Audio Visual Unit is staffed by three persons who share varying responsibilities to provide the audio visual tools that are in constant demand at the Centre. These include slides, overhead transparencies and other items needed for seminars and workshops. The Unit continued to provide support during the year to scientists and others by preparing graphs, illustrations and layouts for publications, posters, brochures and other display materials; taking and developing photographs and slides; and audio and video recording. The AV Unit has its own computers and a scanner for the generation of graphics such as those used in this Annual Report for each Division's organograms. It also has its own photo lab, digital slide maker, and equipment for microphotography.

1995 was a particularly busy year due to the large number of high-profile visitors and conferences. In addition, Glimpse and ICDDR,B News were redesigned with new layouts, and a series of illustrations were prepared for several of the Centre's publications. The Unit continued to provide support to the Hospital Endowment Fund campaign.

### A. INTERNAL PUBLICATION SERIES

- [A 01] ICDDR,B Annual Report, 1994.  
May 1995. 131 p.

### SCIENTIFIC REPORTS

- [A02] Demographic Surveillance System-Matlab.  
V. 23. Registration of demographic events -1992.  
Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, 1995. vi, 88 p. (ICDDR,B Scientific Report, 75)

### SPECIAL PUBLICATIONS

- [A03] Alam AN. Report on Vitamin A Symposium, Dhaka, 31 October 1994. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, 1995. 39 p. (ICDDR,B Special Publication, 39)
- [A04] Hoque BA, Ahmed SA, Munshi MH, Baqui AH, Hussain AMZ. Partnership for improving water, sanitation, solid waste and hygiene education system in rural Bangladesh. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, 1995. 24 p. (ICDDR,B Special Publication, 43)
- [A05] Rabbani GH, Rahim MA, Strong MA, Unicomb L, editors. Health policy challenges: population and cholera; programme and abstracts of the Fourth Annual Scientific Conference of the International Centre for Diarrhoeal Disease Research, Bangladesh, Dhaka, 21-22 January 1995. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh, 1995. xiv, 37 p. (ICDDR,B Special Publication, 38)
- [A06] Wirzba H, Juncker T. Disease patterns, treatment practices and drug requirements in rural MCH-FP government facilities of Bangladesh. Dhaka: MCH-FP Extension Project (Rural), International Centre for Diarrhoeal Disease Research, Bangladesh, 1995. 76 p. (ICDDR,B Special Publication, 41)

### JOURNAL AND NEWSLETTERS

- [A07] **Journal of Diarrhoeal Diseases Research** (also includes: Bibliography on Diarrhoeal Diseases). v. 13, nos. 1-4, 1995.
- [A08] **Glimpse**. v. 16, no. 6, 1994; v. 17, nos. 1-5, 1995.
- [A09] **Shasthya Sanglap**. v. 3, no. 4, 1995; v. 4, nos. 1-3, 1995.
- [A10] **DISC Bulletin**. v. 19, nos. 1-24, 1995.
- [A11] **ICDDR,B News**. v. 6, nos. 1-4, 1995.

## PUBLICATIONS - 1995

(from previous page)

- B. ORIGINAL SCIENTIFIC PAPERS**  
(including short reports)
- [B01] **Alam N.** Birth spacing and infant and early childhood mortality in a high fertility area of Bangladesh: age-dependent and interactive effects. *J Biosoc Sci* 1995 Oct; 27(4): 393-404
- [B02] **Alam N.** Predictors of diarrhoea in young Bangladeshi children. *J Trop Pediatr* 1995 Oct; 41(5): 278-80
- [B03] **Alam NH, Bardhan PK, Haider R, Mahalanabis D.** Trimethoprim-sulphamethoxazole in the treatment of persistent diarrhoea: a double-blind placebo-controlled clinical trial. *Arch Dis Child* 1995 Jun; 72(6): 483-6
- [B04] **Albert MJ, Ansaruzzaman M, Bhuiyan NA, Neogi PKB, Faruque ASG.** Characteristics of invasion of HEp-2 cells by *Providencia alcalifaciens*. *J Med Microbiol* 1995 Mar; 42(3): 186-90
- [B05] **Albert MJ, Ansaruzzaman M, Shimada T, Rahman A, Bhuiyan NA, Nahar S, Qadri F, Islam MS.** Characterization of *Aeromonas trota* strains that cross-react with *Vibrio cholerae* O139 Bengal. *J Clin Microbiol* 1995 Dec; 33(12): 3119-23
- [B06] **Albert MJ, Faruque SM, Faruque ASG, Neogi PKB, Ansaruzzaman M, Bhuiyan NA, Alam K, Akbar MS.** Controlled study of *Escherichia coli* diarrhoeal infections in Bangladeshi children. *J Clin Microbiol* 1995 Apr; 33(4): 973-7
- [B07] **Albert MJ.** *Vibrio cholerae* O139 Bengal: probable causative agent of the eighth pandemic of cholera. *Hong Kong J Paediatr* 1995; 1(1 Suppl): 56-62
- [B08] **Ansaruzzaman M, Kibriya AKMG, Rahman A, Neogi PKB, Faruque ASG, Rowe B, Albert MJ.** Detection of provisional serovars of *Shigella dysenteriae* and designation as *S. dysenteriae* serotypes 14 and 15. *J Clin Microbiol* 1995 May; 33(5): 1423-5
- [B09] **Ansaruzzaman M, Rahman M, Kibriya AKMG, Bhuiyan NA, Islam MS, Albert MJ.** Isolation of sucrose late-fermenting and nonfermenting variants of *Vibrio cholerae* O139 Bengal: implications for diagnosis of cholera [note]. *J Clin Microbiol* 1995 May; 33(5): 1339-40
- [B10] **Azim T, Halder RC, Sarker MS, Ahmed S, Hamadani J, Chowdhury A, Qadri F, Salam MA, Sack RB, Albert MJ.** Cytokines in the stools of children with complicated shigellosis. *Clin Diagn Lab Immunol* 1995 Jul; 2(4): 492-5
- [B11] **Azim T, Islam LN, Halder RC, Hamadani J, Khanum N, Sarker MS, Salam MA, Albert MJ.** Peripheral blood neutrophil responses in children with shigellosis. *Clin Diagn Lab Immunol* 1995 Sep; 2(5): 616-22
- [B12] **Aziz KMA, Yunus M, Bhuiya A.** Recent contributions of behavioural and biomedical scientists in applied anthropology of hygiene practices and management of diarrhoea in Bangladesh. *Int J Anthropol* 1994; 9(4): 309-16\*
- [B13] **Baquai AH, de Francisco A, Arifeen SE, Siddique AK, Sack RB.** Bulging fontanelle after supplementation with 25 000 IU of vitamin A in infancy using immunization contacts. *Acta Paediatr* 1995 Aug; 84(8): 863-6
- [B14] **Bhuiya A, Bhuiya I, Chowdhury M.** Factors affecting acceptance of immunization among children in rural Bangladesh. *Health Pol Plann* 1995 Sep; 10(3): 304-11
- [B15] **Bhuiya A, Streatfield K.** Feeding, home-remedy practices, and consultation with health care providers during childhood illness in rural Bangladesh. *J Diarrhoeal Dis Res* 1995 Jun; 13(2): 106-12
- [B16] **Bhuiyan SH, Rahman H, Haider K.** Study of hemagglutinating property of enteroinvasive *Escherichia coli* from various geographical locations. *Jpn J Med Sci Biol* 1995 Aug; 48(4): 193-8
- [B17] **Clemens J, Albert MJ, Rao M, Qadri F, Huda S, Kay B, van Loon FPL, Sack D, Pradhan BA, Sack RB.** Impact of infection by *Helicobacter pylori* on the risk and severity of endemic cholera [concise communication]. *J Infect Dis* 1995 Jun; 171(6): 1653-6
- [B18] **Clemens J, Rao M, Sack D, Ahmed F, Khan MR, Chakraborty J, Kay B, Huda S, Yunus M, van Loon F, Svennerholm A-M, Holmgren J.** Impaired immune response to natural infection as a correlate of vaccine failure in a field trial of killed oral cholera vaccines. *Am J Epidemiol* 1995 Oct 1; 142(7): 759-64
- [B19] **Conway DJ, Hall A, Anwar KS, Rahman ML, Bundy DAP.** Household aggregation of *Strongyloides stercoralis* infection in Bangladesh. *Tran R Soc Trop Med Hyg* 1995 May-Jun; 89(3): 258-61
- [B20] **Dalsgaard A, Albert MJ, Taylor DN, Shimada T, Meza R, Serichantalergs O, Echeverria P.** Characterization of *Vibrio cholerae* non-O1 serogroups obtained from an outbreak of diarrhoea in Lima, Peru. *J Clin Microbiol* 1995 Oct; 33(10): 2715-22

- [B21] **Faruque SM**, Roy SK, Alim ARMA, Siddique AK, Albert MJ. Molecular epidemiology of toxigenic *Vibrio cholerae* in Bangladesh studied by numerical analysis of rRNA gene restriction patterns. *J Clin Microbiol* 1995 Nov; 33(11): 2833-71
- [B22] **Giron JA**, Qadri F, Azim T, Jarvis KJ, Kaper JB, Albert MJ. Monoclonal antibodies specific for the bundle-forming pilus of enteropathogenic *Escherichia coli* [note]. *Infect Immun* 1995 Dec; 63(12): 4949-52
- [B23] **Giron JA**, Viboud GI, Sperandio V, Gomez-Duarte OG, Maneval DR, Albert MJ, Levine MM, Kaper JB. Prevalence and association of the longus pilus structural gene (IngA) with colonization factor antigens, enterotoxin types, and serotypes of enterotoxigenic *Escherichia coli*. *Infect Immun* 1995 Oct; 63(10): 4195-8
- [B24] **Haider R**, Begum S. Working women, maternity entitlements, and breastfeeding: a report from Bangladesh. *J Hum Lact* 1995; 11(4): 273-7
- [B25] **Hanif M**, Mobarak MR, Ronan A, Rahman D, Donovan JJ, Jr., Bennish ML. Fatal renal failure caused by diethylene glycol in paracetamol elixir: the Bangladesh epidemic. *Br Med J* 1995 Jul 8; 331(6997): 88-91
- [B26] **Haque R**, Neville LM, Hahn P, Petri WA, Jr. Rapid diagnosis of *Entamoeba* infection by using *Entamoeba* and *Entamoeba histolytica* stool antigen detection kits. *J Clin Microbiol* 1995 Oct; 33(10): 2558-61
- [B27] **Hoque BA**, Mahalanabis D, Alam MJ, Islam MS. Post-defecation handwashing in Bangladesh: practice and efficiency perspectives. *Public Health* 1995 Jan; 109(1): 15-24
- [B28] **Hoque BA**, Mahalanabis D, Pelto B, Alam MJ. Research methodology for developing efficient handwashing options: an example from Bangladesh. *J Trop Med Hyg* 1995 Dec; 98(6): 469-75
- [B29] **Hoque SS**, Alam AN, Kibriya AKMG, Albert MJ. *Moraxella* septicemia in children with diarrhoeal disease [case report]. *Diagn Microbiol Infect Dis* 1995 Apr; 21(4): 215-7
- [B30] **Islam D**, Wretling B, Ryd M, Lindberg AA, Christensson B. Immunoglobulin subclass distribution and dynamics of *Shigella*-specific antibody responses in serum and stool samples in shigellosis. *Infect Immun* 1995 May; 63(5): 2054-61
- [B31] **Islam D**, Bardhan PK, Lindberg AA, Christensson B. *Shigella* infection induces cellular activation of T and B cells and distinct species-related changes in peripheral blood lymphocyte subsets during the course of the disease. *Infect Immun* 1995 Aug; 63(8): 2941-9
- [B32] **Islam MN**, Hossain MA, Rahman M, Yasmin M, Alam AN, Hoque M, Sattar H. Development and evaluation of co-agglutination test to detect rotavirus antigens in stools of patients with diarrhoea. *Bangladesh Med Res Counc Bull* 1995 Apr; 21(1): 11-7
- [B33] **Islam MR**, Alam AN, Hussain MS, Mahalanabis D. Effect of antimicrobial (nalidixic acid) therapy in shigellosis and predictive values of outcome variables in patients susceptible or resistant to it. *J Trop Med Hyg* 1995 Apr; 98(2): 121-5
- [B34] **Islam MS**, Alam MJ, Miah MA, Felsenstein A, Sack RB. Detection of non-culturable *Vibrio cholerae* O139, by PCR and fluorescent antibody methods, in laboratory microcosms [short communication]. *World J Microbiol Biotechnol* 1995 Sep; 11(5): 597-8
- [B35] **Islam MS**, Siddique AKM, Salam A, Akram K, Zaman K, Fronczak N, Laston S. Microbiological investigation of diarrhoea epidemics among Rwandan refugees in Zaire [short report]. *Trans R Soc Trop Med Hyg* 1995 Sep-Oct; 89(5): 506
- [B36] **Islam MS**, Alam MJ, Khan SI. Occurrence and distribution of culturable *Vibrio cholerae* O1 in aquatic environments of Bangladesh. *Int J Environ Stud* 1995 Mar; 47(2-3): 217-23
- [B37] **Khaled MA**, Kabir I, Mahalanabis D. Effect of protein energy supplementation on oxidative stress in malnourished children. *Nutr Res* 1995 Aug; 15(8): 1099-1104
- [B38] **Khan AM**, Albert MJ, Sarker SA, Bhattacharya MK, Azad AK. Septicemia due to *Vibrio cholerae* O139 Bengal [case report]. *Diagn Microbiol Infect Dis* 1995 Aug; 22(4): 337-8
- [B39] **Khan WA**, Dhar U, Begum M, Salam MA, Bardhan PK, Mahalanabis D. Antimicrobial treatment of adults with cholera due to *Vibrio cholerae* O139 (synonym Bengal). *Drugs* 1995; 40(2 Suppl): 460-2
- [B40] **Khan WA**, Seas C, Dhar U, Salam MA. Bacterial meningitis in a diarrhoeal disease treatment centre in Bangladesh, and susceptibility of the pathogens to antimicrobials [short communication]. *Acta Paediatr* 1995 Jun; 84(6): 693-4

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- [B42] **Khan WA**, Salam MA, Bennish ML. C reactive protein and prealbumin as markers of disease activity in shigellosis. *Gut* 1995 Sep; 37(3): 402-5
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## Inter-Division Scientific Forum List

### Clinical Sciences Division

**Alvarez JO.** Effect of infection on vitamin A status and metabolism.

**Bardhan PK.** Occult blood in stool: a simple screening test in diarrhoea.

**Butzner JD.** Impact of malnutrition and enteric infections on intestinal function in the infant: lessons from animal models.

**Dhar U.** Comparison of features of severe cholera due to *V. cholerae* O1 and *V. cholerae* O139.

**Hamilton JR.** Is biomedical research in Bangladesh irrelevant? A view from the shores of the alimentary canal.

**Islam S.** Transport of water, sodium and glucose in animal models from electrolyte solutions with and without bicarbonate.

**Khan WA.** Single dose antimicrobial therapy in the treatment of *V. cholerae* O1.

**Mitra AK.** Changes in vitamin A in children during acute shigellosis – some preliminary data.

**Rabbani GH.** Gastric acid secretion in Bangladeshi patients with diarrhoea and dysentery.

**Sarker SA.** Assessment of gastric acid secretion by a novel non-invasive method.

### Community Health Division

**Chowdhury AI.** Effect of child survival on contraceptive use in Bangladesh.

**Chowdhury AMR, Aziz KMA, Bhuiya A.** Studying sustainability of immunization through social science approaches.

**de Francisco A, Rahman M.** What about ALRI? Recent results from Matlab.

**Desmet M.** Health care utilization by the slum residents in Dhaka City.

**Jerardi M.** Socio-economic status correlates to malnutrition in Matlab: A fresh look at the BRAC-ICDDR,B baseline data.

**Myaux J. Matlab:** Effect of environmental changes on morbidity and mortality in children.

**Zaman K.** Association between nutritional status, cell-mediated immune status and acute lower respiratory infections in Bangladeshi children.

### Laboratory Sciences Division

**Ahmed ZU.** Evaluation of live cholera candidate vaccine strains in rabbit.

**Alabi SA.** An evaluation of the role of *Aeromonas* species as a causative agent of acute watery diarrhoea in Bangladesh.

**Azim T.** Lymphocyte phenotype and function in children who develop complications in shigellosis.

**Faruque SM.** Natural selection of toxigenic *Vibrio cholerae*: role of *ctx* genetic element.

**Glass RI.** Prospects for rotavirus vaccines.

**Qadri F.** Antigen-specific immune responses in cholera – an overview.

**Rahman M.** Pattern of serotypes and antimicrobial resistance of *Vibrio cholerae* isolates in Dhaka, Bangladesh.

**Unicomb L.** Risk factors for neonatal rotavirus infection.

**Wahed MA.** Prevalence of sub-clinical vitamin A deficiency in healthy six-month-old infants in Bangladesh.

### Population and Family Planning Division

**Ahmed MK.** Determinants of abortion in rural Bangladesh.

**Arifeen SE.** Birth weight and neonatal mortality in the slums of Dhaka.

**Arifeen SE.** A preliminary assessment of MCH-FP programme needs in Zone 3 of Dhaka City and proposed interventions.

**Barkat-e-Khuda, Hossain MB.** Fertility decline in Bangladesh: Toward an understanding of major causes.

**Fronczak N.** Delivery providers for urban slum women.

**Khan N.** Patterns of migration in Matlab: 1974-1982.

**Menken J.** Impact of breast feeding on population, growth, and change.

**Mirza T.** Quality of care of injectable contraceptive services in the national Family Planning Programme.

**Mozumder KA, Khan MA, Rahman M.** Situation of the MCH-FP Programme in Sirajganj: Effects of withdrawal of extension project activities.

**Rahman O.** Matlab health and socioeconomic survey.

**Roy NC.** Effect of birth spacing, breast feeding and diarrhoea on nutritional status of children (aged 1-4) in Matlab, Bangladesh.

**Strong MA.** Demographic Surveillance System: Early Indicators, Matlab -1994.

## **TCB Training Coordination Bureau (TCB)**

Head: A.N. Alam

As part of the Centre's mandate, the Training Coordination Bureau (TCB) provides training to Bangladeshi and other nationals. Training is a key component of the Centre's strategy to disseminate its findings, to develop research capabilities, to enhance expertise amongst professionals in MCH-FP programmes, including diarrhoeal disease control (CDD) and family planning programmes. It does so by conducting a variety of training courses, workshops and seminars and also offering fellowships.

In 1995, 428 scientists, physicians, health administrators, health personnel and trainers from 30 countries received training at the Centre. The Centre received support from the Government of Japan, the Swedish Agency for Research Co-operation with Developing Countries (SAREC), USAID, and the American Express Bank Foundation (through the Child Health Foundation) for the training programme. In addition, several agencies sponsored participants in different training courses.

### **Health Research Training**

The programme comprises fellowships, workshops and courses, and opportunities for participants to receive training in research methodology through ongoing research projects. A total of 66 persons from seven countries participated in this programme.

**Health Research Training Fellowships:** These fellowships are for 1-2 years, depending on the research project undertaken. Three fellows – one each from India, Ethiopia and Nigeria – participated in this programme.

**Research Methodology Workshop:** A 2-week workshop was attended by 13 persons, including six staff members of the Centre and seven others from Bangladesh, India, Vietnam, Ethiopia, Ghana, and Kenya. Participants acquired skills to develop and implement clinical research proposals, and to analyze and interpret data.

**Course on Epidemiological Methods in Public Health:** Two 4-week courses were organized in collaboration with national institutions and NGOs, and were attended by 38 participants from various national institutions of Bangladesh. The course aimed at training the participants on how to plan, design, analyze and undertake epidemiological studies.

**Project-based fellows:** To provide opportunities to young Bangladeshi medical, biomedical and social sci-

ence graduates to develop skills in health research, the Centre has instituted a programme of practical training through its ongoing research protocols. In 1995 the programme provided training to two graduates selected on a competitive basis.

**Training of Bangladeshi university students:** In the Centre's research laboratories, 15 M.Sc. and one Ph.D. students of Dhaka and Jahangirnagar universities carried out research work for their dissertations.

### **Training of Trainers**

TCB organizes training courses to update the knowledge and skills of trainers in the prevention, case management and laboratory diagnosis of diarrhoeal diseases. The Training of Trainers (TOT) courses aim at creating trained human resources to strengthen CDD programmes.

**Clinical Management of Diarrhoeal Diseases:** Fifteen physicians, nurses, and diarrhoeal disease control programme managers (three each from Uganda, Laos and Cambodia, four from Vietnam, and two from Bangladesh) attended this two-week course. The course was designed to provide participants with the skills necessary to diagnose and treat diarrhoeas of different aetiologies and their complications.

**Laboratory Diagnosis of Common Diarrhoeal Disease Agents:** A two-week course was attended by 13 participants: three from Cambodia, two each from Indonesia, Laos and Bangladesh and one each from the Philippines, Tanzania, Sudan and Myanmar. The course provided the participants with an opportunity to learn procedures for isolation and identification of pathogens, preparation of culture media, and laboratory safety.



*Dr. Mahbubur Rahman of LSD conducts a practical session of the international training course on Laboratory Diagnosis of Common Diarrhoeal Disease Agents.*

**Training of Nurse Trainers:** A two-week intensive training course was developed for 13 nurse-trainers from Bangladesh, India, Sri Lanka, Pakistan, Indonesia and Thailand. The course trained participants on the prevention and control of diarrhoea epidemics and the treatment of patients during epidemics.

**Training Workshop on Emergency Response to Cholera and *Shigella* Epidemics:** Following the Centre's successful intervention in Goma, the USAID Office of Foreign Disaster Assistance requested the Centre to develop and organize a training workshop for training of international agencies which respond to disaster situations. The workshop provided the participants "hands-on" training in the hospital in Dhaka and in makeshift diarrhoea treatment centres in the field. The workshop was attended by eight participants from international, non-government organizations, including International Medical Corps, Catholic Relief Services, Medecins Sans Frontiers, CARE, and World Vision.

At the end of two weeks, participants and an external reviewer from the Centers for Disease Control and Prevention (CDC) evaluated the course. The evaluation indicated that though the overall objectives were achieved, the workshop curriculum needed modifications. Accordingly, the workshop schedule is being revised. Similar workshops will be offered in 1996 and beyond. A refresher/training video will also be produced for use by international NGOs at their headquarters.

#### **Family Planning Training Programme**

A population programme's effectiveness depends largely on its ability to meet people's needs and provide ever increasing quality of care. Operations research is an effective mechanism to enable family planning programmes to meet these objectives.

During 1995, TCB organized workshops on "Improving Family Planning Programme Effectiveness and Quality of Care through Operations Research" based on its experience in Matlab and two MCH-FP Extension projects. Three such workshops were arranged; two were organized with support from the Government of Japan and one was organized in collaboration with the Commonwealth Secretariat, UK, the International Council on Management of Population Programmes (ICOMP), Malaysia, and with partial support from the UNFPA.

These workshops were attended by 35 participants from 14 countries of Asia and Africa. The participants rated the workshop as excellent and noted that such workshops can contribute towards strengthening the MCH-FP programmes in developing countries.

#### **International Training Activities on Family Planning (MCH-FP)**

Workshop Directors: A. de Francisco and A.N. Alam

Funded by: Government of Japan

Two international training workshops on family planning were conducted in 1995. The first, entitled "International Workshops on Family Planning Programmes for NGOs in the SAARC Region," was conducted during March 11-23 and targeted programme managers of NGOs in the SAARC region. Participants from Pakistan, India, and Bangladesh took part.

Other participants included representatives from IPPF (International Planned Parenthood Federation) and from major organizations playing important roles in family planning programmes in these countries. The workshop concentrated mainly on operational and managerial issues on family planning programmes.

The second course, conducted during 19-29 November, was entitled "International Workshop on Improving Family Planning Programme Effectiveness and Quality of Care Through Operations Research" and targeted senior staff from family planning programmes throughout the Asian region. The purpose of the workshop was to transfer knowledge from lessons learned by the Matlab MCH-FP project on operations research issues related to programme performance to the Government initiative through the MCH-FP Extension programmes of the Centre.

Evaluation of both programmes was carried out, and positive marks were given by the participants. A long-term follow-up will be carried out after a year.

#### **Clinical Training Programme**

The main objective of this programme is to provide fellows with clinical skills in diagnosing and treating patients with diarrhoea and malnutrition, and to provide insight into research methods. The Centre offered fellowships to 60 persons for training in research and other aspects of diarrhoeal diseases.

**Fellowship for SAARC Countries:** Started in 1988 with support from the Government of Japan, this programme offers three-month-long training for fellows from countries in the South Asia Association for Regional Cooperation (SAARC).

The aim is to provide training to health professionals in different aspects of diarrhoeal diseases and community health for the purpose of strengthening the CDD programmes. Four fellows – two from Bangladesh, and one each from the Maldives and Sri Lanka – received training during 1995.

### **TCB** Government of Bangladesh Fellowship Programme:

At the request of the Director-General of Health Services, the GOB fellowship programme was started in 1989. Each year, eight one-year fellowships are offered to medical graduates from eight medical colleges. The programme provides intensive "hands-on" training to the fellows on the clinical management of diarrhoeal diseases and their complications, along with exposure to epidemiology and laboratory aspects.

In 1995, a formal evaluation was carried out by an external reviewer to assess: (1) utilization of fellows in control of diarrhoeal disease programme, and (2) use of skill acquired through training in their present jobs. The findings indicate that the training was useful. However, the report suggests that the programme would be better utilized if the fellowships were offered to medical graduates intending to pursue postgraduate studies, rather than to fresh graduates awaiting employment in government service.

**Clinical Fellowships:** The programme provides intensive training in different aspects of diarrhoeal diseases to physicians who have completed at least one year's training either in paediatrics or internal medicine and are interested to pursue postgraduate studies. Fellows are selected on a competitive basis, and 14 fellows received training in 1995.

**Fellowship for Nurses:** The objective of the programme is to provide trainees with "hands-on" training at the Centre's hospital to assist the national CDD programme. In 1995, the Centre offered 10 fellowships on a competitive basis.

**Other Fellowships:** Twenty-five fellows from the USA, the UK, Bangladesh, Pakistan, Vietnam, Philippines, Holland, Belgium, Nepal, Japan, and Sri Lanka received training on different aspects of diarrhoeal diseases. They worked in the hospital or in the community and assisted the PIs with research protocols or conducted their own research.

### **Other National Training Courses**

Three short courses emphasizing bedside clinical management of diarrhoeal diseases and undernutrition were organized during the year for five paediatricians from the Bangladesh Institute of Child Health and 43 graduate students of the Nursing College, Mohakhali. A national Workshop on Surveillance, Screening and Control of HIV was conducted during September 23-28, in collaboration with the University of Alabama at Birmingham, with the University of California at Los Angeles, and with the Institute of Epidemiology, Disease Control and Research, Bangladesh. Twenty-

five participants from various government and non-government organizations expecting to become involved in the prevention and control of HIV attended the workshop.

### **Short-term Courses and Seminars**

During the year, a series of one and two-day courses on the management of diarrhoeal diseases were organized for 146 students and health professionals from Bangladeshi institutions.

To maximize the exchange of information, 23 seminars were organized during the year in addition to 30 inter-divisional scientific forums and 13 clinical seminars at the hospital. Both resident and visiting scientists made presentations on various topics.

### **Social and Behavioural Science Workshops and Seminars**

◆ A workshop for "Training Coordinators in the Development and Implementation of HIV-AIDS Prevention Programme for Employees" was held at the Sasakawa Seminar Room from 4-6 December. Financial and technical assistance for the workshop was provided by AIDSCAP. About 28 participants from 17 organizations participated. A staff education implementation guideline "Get Ready, Get Set, Act" was prepared and distributed to NGOs.

◆ A five-day-long workshop on HIV Surveillance, Screening and Control was held at Sasakawa from 23-28 September. This workshop was jointly organized by ICDDR,B, the University of Alabama at Birmingham, the University of California, Los Angeles, and the Institute of Epidemiology, Disease Control and Research, Dhaka. About 25 participants from the government and leading NGOs participated in the workshop.

◆ A one-day seminar on AIDs was organized by ICDDR,B, the French Embassy and its affiliate CESTI (Center for Scientific and Technical Information) on 24 September 1995. Dr. F. Clavel (Oncology and Virology Service, Pasteur Institute) and Prof. Maidul Islam (Professor of Dermatology and Virology, IPGMR) presented papers. The seminar was followed by a poster exhibition on AIDS, developed by French artists.

◆ An NGO conference, sponsored by AIDSCAP, for a national consensus on HIV-AIDS was organized at the Panda Garden, Dhaka, during 27-29 November. The Centre played a key role in the planning and implementation of the workshop. More than 70 persons from NGOs were represented. A specific agreement and recommendations for HIV-AIDS programming were agreed upon. ■



*(Top left) The Centre's hospital provides fellows and participants of clinical management courses unique opportunities to exercise their new diagnostic and treatment skills on a wide variety of patients. (Top right): Participants in the Laboratory Diagnosis of Diarrhoeal Disease Agents course return to train laboratory technicians in their own countries. (Above): Members of one of three family planning training workshops make a field visit to Matlab and hear a Community Health Worker explain her role.*

## TCB Staff Development

Manager: B.R. Saha

One of the mandated activities of the Centre is to undertake a systematic staff development programme. The programme has helped the Centre 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 is 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 organizations for the training of individual staff members, the Centre received direct financial support from the Swiss Development Cooperation for the programme.

### Overseas Training

At the beginning of the year, 20 staff members were on training in various universities. During the year,

an additional 24 departed to begin studies and 24 others returned.

A brief description of staff members who have acquired degrees are given below:

**Dr. Mahbubur Rahman** of the Laboratory Sciences Division (LSD) earned a Ph.D. degree with distinction in Microbiology from the Vrije Universiteit Brussel (VUB), Belgium. His dissertation was "New insights in identification, epidemiology and molecular mechanisms of antimicrobial resistance of Shigella isolated in Bangladesh." **Dr. Dilara Islam** of LSD earned a Ph.D. degree from the Karolinska Institute, Sweden. Her thesis was "Cellular and humoral immune responses in shigellosis." **Dr. Rubhana Raqib** of LSD earned a Ph.D. degree from the same Institute. Her thesis was "Pathogenesis and immune responses in shigellosis." **Mr. Sheikh Jalal Uddin** of LSD earned a Master's degree in Molecular Biology from Vrije Universiteit Brussel (VUB), Belgium. **Dr. Hasan Ashraf** of CSD gained an MD in Gastroenterology from the University

Distribution of staff, by discipline and degrees being earned, who left for training in 1995

Field of study or training	Ph.D. (n=1)	Masters (n=6)	Non-degree short training (n=17)	Total (n=24)
Primary health care Community medicine Public health policy	1	3	2	6
Reproductive health research	0	0	3	3
Clinical epidemiology	0	1	0	1
Microbiology Biochemistry Clinical nutrition	0	1	4	5
Software and preventive maintenance of analyzer	0	0	2	2
Nursing	0	0	1	1
Library database	0	0	2	2
Animal management	0	0	1	1
Management	0	0	2	2
Mother and child health	0	1	0	1

of Basel, Switzerland. **Dr. M. Mujibur Rahman** of CSD received an MPH degree from the University of Alabama at Birmingham, USA and is continuing studies for a Ph.D. at the same university. **Dr. Syed Samiul Hoque** of CSD acquired a Master of Medical Science degree from the University of Birmingham, UK and is continuing studies for a Ph.D. **Mr. Nikhil C. Roy** and **Mr. Nurul Alam**, both of the Health and Population Extension Division (HPED), acquired Master's degrees in Medical Demography from the London School of Hygiene & Tropical Medicine, UK.

Finally, in 1995, 66 staff members attended 45 scientific conferences outside Bangladesh.

### In-country Training

During the year, 11 staff were sent to institutions in Bangladesh for training in primary health care, computer science and English language, and one person

attended a full-time course for a diploma in Child Health at the Dhaka Shishu Hospital.

**Dr. A.S.M. Hamidur Rahman** of LSD gained a Ph.D. degree from the Bangladesh Agricultural University for his research work on "Natural and experimental cryptosporidiosis in calves, mice, rats and chickens."

### In-house Training

Twenty-seven staff attended in-house workshops and courses on Research Methodology; Epidemiological Methods in Public Health; Surveillance; Screening and Control of HIV; and a course on management and administration for project office managers and secretaries.

Regular ward rounds by paediatric and radiology consultants were arranged at the Clinical Research & Service Centre for the continuing education of the hospital physicians.



*Drs. Rubhana Raqib and Dilara Islam, assistant scientists at LSD who recently earned their Ph.D. degrees in Clinical Bacteriology from the Karolinska Institute, Huddings Hospital, Sweden, are seen conducting research at ICDDR, B's Immunology Laboratory.*

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 1995 members were:

THE BOARD OF TRUSTEES

- Dr. Maureen Law (Canada),**  
Chairperson
- Dr. Demissie Habte (Ethiopia),**  
Secretary
- Prof. J. Caldwell (Australia)**  
until June
- Prof. Peter F. McDonald (Australia)**  
from July
- Mr. Syed Ahmed (Bangladesh)**
- Mr. Md. Lutfullahil Majid (Bangladesh)**
- Maj. Gen. (Retd) M.R. Choudhury (Bangladesh)**
- Prof. Chen Chunming (China)**
- Prof. P. Helena Makela (Finland)**
- Dr. Yoshifumi Takeda (Japan)**
- Dr. Julio J. Frenk (Mexico)**  
until June
- Prof. Fehmida Jalil (Pakistan)**
- Dr. Yagob Y. Al-Mazrou (Saudi Arabia)**  
until June
- Dr. Tawfik A.M. Khoja (Saudi Arabia)**  
from July
- Mr. Jacques O. Martin (Switzerland)**
- Prof. F.S. Mhalu (Tanzania)**
- Dr. Jon E. Rohde (UNICEF, New Delhi)**
- Prof. J.R. Hamilton (Canada)**  
until June
- Prof. Rita R. Colwell (USA)**  
from July
- Dr. R.H. Henderson (WHO, Geneva)**

The Programme Coordination Committee (PCC) is a Committee established by the Board, its prime objective being the coordination of research with national health institutions. It also strives to strengthen research capabilities and promote collaborative research with these institutions.

PCC is composed of 53 members: five from the Centre, three nominated by the Board of Trustees, three nominated by the Ministry of Health & Family Welfare, and the remaining from the Government health departments or institutions, universities and non-governmental organizations related to health, nutrition, education, population studies and development.

The Chairman is Prof. M.A. Matin, the Vice Chairman is Prof. Kamaluddin Ahmad, and the Member-Secretary is Dr. Demissie Habte. The 1995 members were:

**ICDDR,B:** Director; Division Directors of CSD, CHD, LSD, and HPED.

**Board of Trustees:** Prof. J.R. Hamilton, Prof. Chen Chunming, and Dr. Y.Y. Al-Mazrou.

**Government of Bangladesh:** Directors General of Health Services; Family Planning; and National Institute of Population Research and Training (NIPORT);

Joint Secretary (Health), Ministry of Health and Family Welfare;

Directors of the Institute of Epidemiology Disease Control and Research (IEDCR), the Institute of Post Graduate Medicine & Research (IPGM&R), the Institute of Public Health (IPH), the National

Institute for Preventive and Social Medicine (NIP-SOM), 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; Project Director, CDD Programme.

**Academic Institutions:** Vice Chancellors of the Bangladesh Agricultural University, the Bangladesh University of Engineering & Technology (BUET), Chittagong University, Dhaka University, Islamic University, Jahangirnagar University, Khulna University, Rajshahi University and the Shahjalal University of Science & Technology.

**Others:** Prof. M.A. Matin, Prof. Kamaluddin Ahmad, Prof. Nurul Islam, Prof. T.A. Choudhury, Prof. K.A. Monsur, Maj. Gen. (Retd.) 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;

Chairman of the Bangladesh Agricultural Research Council (BARC), and of the Bangladesh Council of Scientific & 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 for Promotion of Essential and Reproductive Technologies Research (BIRPERHT), the Institute of Bangladesh Studies (IBS), Rajshahi University; the Underprivileged Children's Education Programme (UCEP); and of the Bangladesh Medical Research Council; Programme Director, the Bangladesh Rural Advancement Committee (BRAC); Professor of Paediatrics, Dhaka Shishu Hospital; and Prof. S.M. Nurul Alam, Department of Anthropology, Jahangirnagar University.

In June 1995 the Board of Trustees and the Standing Committee of PCC met jointly and discussed issues related to strengthening research capabilities of health research institutions. Also discussed was a report on collaborative activities between the Centre and national institutions presented by the Member-Secretary.

**The following PCC-collaborative protocols were supported by the Centre in 1995 at a total cost of US\$10,800.00:**

- (a) A study on health-related behaviour among the primary school children  
PI: Dr. M. Nazmul Haq, Assistant Professor, Institute of Education & Research, Dhaka University (completed in September)
- (b) Studies on streptococcal pneumoniae: a major cause of child mortality in Bangladesh  
PI: Dr. Samir K. Saha, Associate Professor, Department of Microbiology, Dhaka Shishu Hospital (completed in September)

The Centre's scientists provided technical assistance and guidance to the scientific staff of national institutions in developing research proposals and undertaking research in their institutions. Investigators from those institutions also participated in the ongoing research protocols at the Centre.

#### **The Research Review Committee (RRC):**

This Committee reviews all research proposals of the Centre with regard to their scientific merit, competence of the PIs, relevance to Centre's objectives & priorities and financial resources. The Committee is composed of clinicians, social scientists, laboratory scientists, epidemiologists and demographers from both within and outside the Centre. During 1995, RRC met ten times and considered 30 protocols. The members of RRC in 1995 were:

- Dr. Demissie Habte - Chairman
- Prof. Kamaluddin Ahmad (external)
- Dr. M.J. Albert
- Dr. P.K. Bardhan
- Dr. Abdullah-hel Baqui
- Prof. T.A. Choudhury (external)
- Dr. George Fuchs
- Dr. Michael A. Strong (up to June)
- Prof. Md. Nazrul Islam (external)
- Dr. James L. Ross
- Dr. Patrick J. Vaughan (since October)

#### **The Ethical Review Committee (ERC):**

ERC meets regularly to examine the ethical issues of research involving human subjects and clears protocols before studies are undertaken. This

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 persons represent varying disciplines. In 1995, ERC met ten times and considered 22 protocols. The members of ERC in 1995 were: (\* external, \*\*ICDDR,B)

Dr. K.M.A. Aziz, Anthropology,\*\*  
 Dr. Halida Hanum Akhter, Population Science\*  
 Ms. Nafiza Anwar, Nursing,\*\* (since August)  
 Ms. Husna Ara Begum, Nursing\*\* (up to June)  
 Prof. S.A.R. Chowdhury, Pharmacology\*  
 Prof. A.B.M. Habibur Rahman Choudhury, Religion \*  
 Brig. Q.M.S. Hafiz, WHO, Dhaka\*  
 Prof. Farida Huq, Microbiologist\*  
 Dr. Mahmuda Islam, Social Science\*  
 Prof. Khursheed Jahan, Nutrition\*  
 Prof. Barkat-e-Khuda, Population Science \*\*  
 Prof. M.A. Majid, General Surgery\*  
 Mrs. Sayeda Rowshan Qadir, Women's Affairs\*  
 Dr. Shafiqur Rahman, Community Medicine\*  
 Dr. Rafiqur Rahman, Legal Practice\*  
 Dr. M.A. Salam, Clinical Science\*\*

#### The Animal Ethics Experimentation Committee (AEEC):

AEEC was established by the Board to ensure compliance of the standard procedures for protection of research animals at the Centre. The Committee reviews protocols involving research using animals at Pre-RRC level, and gives clearance to those protocols.

AEEC met twice in 1995 and cleared four studies. The members of AEEC in 1995 were:

Dr. M.A. Jalil, Veterinary and Animal Husbandry Chairman  
 Prof. A.N.M. Abdul Qadir, Parasitologist\*  
 Prof. Abu Tweb Abu Ahmed, Zoologist \*  
 Dr. Md. Afzal Hossain Miah, Virologist\*  
 Mr. S.E. Kabir, layperson (up to June)\*  
 Dr. Mohammad Hossain, Veterinary Science (from July)\*  
 Dr. K.A. Al-Mahmud, Veterinarian\*\*  
 Dr. Firdausi Qadri, Immunologist\*\*



*Two longtime and active members of the Board of Trustees - Prof. John Caldwell of Australia and Prof. Richard Hamilton of Canada (holding their farewell gifts) - completed their terms in 1995.*

## The Staff Welfare Association

President: K.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).

The constitution of the SWA was amended in 1995, extending the tenure of the Executive Committee(s) to two years. There is a single President for the two bodies, but each with its own Executive Committees as follows:

	<b>President</b>	
	Kh. Abdullah Al-Mahmud	
	<u>DHAKA</u>	<u>MATLAB</u>
<b>Vice-President</b>	Md. Nazrul Islam	Md. Mokbul Hossain
<b>General Secretary</b>	Md. Abul Hossain	Ruhul Amin
<b>Joint Secretary</b>	Md. Nurul Hoque Sikder	Khalilur Rahman
<b>Treasurer</b>	Harun-ur-Rashid	Md. Siddiqur Rahman
<b>Athletic Secretary</b>	Md. Delwar Hossain	Sadu Miah Mirdha
<b>Social &amp; Entertainment Secretary</b>	Mohd. Abdullah	Abdul Malek Patwary
<b>Literary &amp; Cultural Secretary</b>	Nazmul Ahsan	Md. Ismail

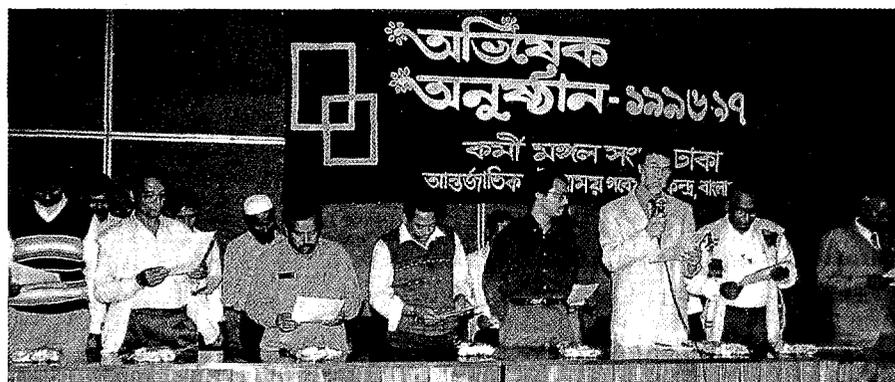
### Members of the Executive Committee:

#### DHAKA

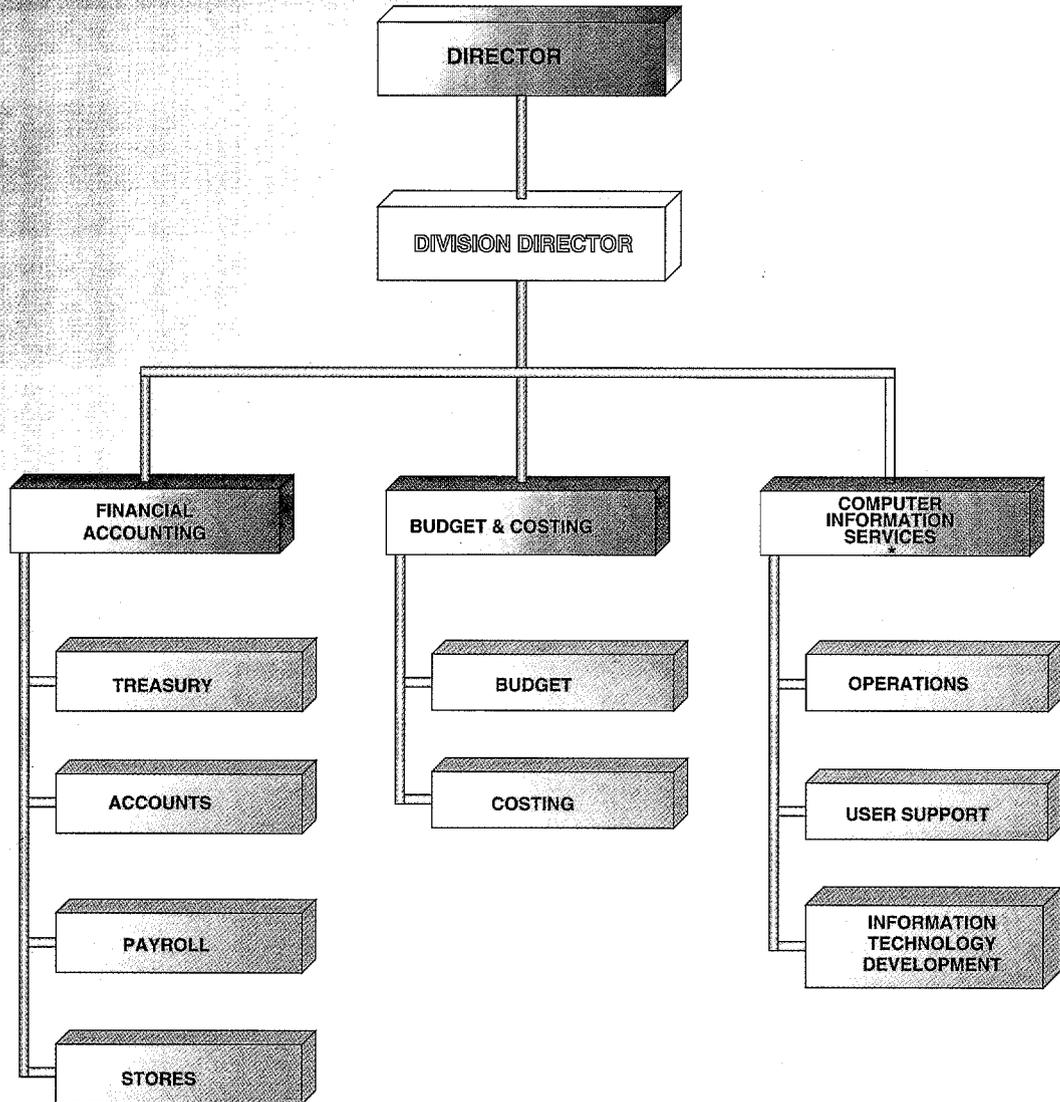
Abdul Mannan, Md. Delwar Hossain, Md. Kabir Ahmed Bhuiyan, Md. Osman Ali, Abdul Khaleque, Md. Shafiqul Islam, Abdus Sobhan, II

#### MATLAB

Shah Mustafa Kamal, Md. Aftekharuzzaman, Nasir Ahmed, Fatema Akter, Shaikh Abdul Jabbar, Md. Mozibur Rahman, and Sultana Razia.



# FINANCE DIVISION



\*Since December 1995

# 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. The Division 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.

## Division Highlights

- Computer information services was transferred to the Finance Division during 1995 and has the responsibility for the provision of main frame computer services through an IBM 4361, provision of E-mail facilities, personal computer laboratory services, personal computer repair and maintenance and information technology development.
- 1995 saw the enhancement and expansion of E-mail facilities and the final draft of the proposed new information technology strategy, which will include both a UNIX and IBM platform and a backbone network. The estimated cost, including project management and training, of the new information system is approximately \$900,000 of which ODA of the United Kingdom has agreed to contribute \$470,000. Other donors are being actively pursued to fund the balance of this essential project.
- In 1995, after adjusting for disaster relief funds, ICDDR,B was affected by a reduction of \$47,899 in contributions to its central activities and even though contributions to projects increased, the overhead from projects was insufficient to offset this reduction.

**Finance**

◆ Contributions from donors after deducting contributions for fixed asset expenditure of US\$489,954 (1994 US\$364,156) increased by 15.1% from US\$10,104,082 to US\$11,624,600. The increase included \$287,851 (1994 \$nil) for disaster relief activities.

◆ Net expenditure after deducting miscellaneous receipts of US\$789,862 (1994 US\$675,591), but excluding depreciation, increased by 11.2% from US\$10,628,240 to US\$11,816,887.

◆ The operating cash deficit was US\$192,287 (1994 US\$524,158) which, after charging depreciation of US\$840,692 (1994 US\$719,818),

resulted in a net deficit for the year of US\$1,032,979 (1994 US\$1,243,976).

◆ Net current assets fell by US\$363,047 due to a decrease of US\$339,299 in cash and deposits and a decrease of US\$23,748 in net other current assets.

◆ 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\$7,520,464 (1994 US\$6,646,528).

### Auditors' Report to the Board of Trustees of the International Centre for Diarrhoeal Disease Research, Bangladesh

We have reviewed the following abridged financial statements comprising the Balance Sheet, Statement of Income and Expenditure and Source and Application of Funds which contain information extracted from the accounting records of the International Centre for Diarrhoeal Disease Research, Bangladesh for the year ended December 31, 1995.

We confirm that the information set out in the following abridged financial statements is consistent with that contained in the audited financial statements for the year ended December 31, 1995, on which we have expressed an unqualified opinion.

*ACNABIN*

ACNABIN & CO.  
Dhaka, March 19, 1996

*Deloitte Haskins & Sells*

DELOITTE HASKINS & SELLS



*The Secretary (ERD), Ministry of Finance, and member of the Board of Trustees, with the Acting Director, Division Director, Finance, other senior staff of ICDDR,B and the Auditors signing the 1995 annual financial statements.*

### Balance Sheet (US\$ 000) - Abridged

	<u>1995</u>	<u>1994</u>
<b>Assets</b>	<b>12,473</b>	<b>12,970</b>
Cash and deposits	5,190	5,529
Accounts receivable	2,355	2,554
Inventories	480	408
Property, plant and equipment	4,448	4,479
<b>Total liabilities and fund balances</b>	<b>12,473</b>	<b>12,970</b>
<b>Liabilities</b>	<b>6,159</b>	<b>6,261</b>
Accounts payable and other	6,159	6,261
<b>Fund balances</b>	<b>6,314</b>	<b>6,709</b>
Fixed assets	4,448	4,479
Fixed asset acquisition and replacement	267	301
Reserve	2,215	2,352
Operating	(616)	(423)

### Statement of Income and Expenditure (US\$ 000) - Abridged

	<u>1995</u>	<u>1994</u>
<b>Income</b>	<b>12,415</b>	<b>10,780</b>
Donors' contributions	12,115	10,468
Other items - net	300	312
<b>Expenditure</b>	<b>13,448</b>	<b>12,024</b>
Personnel	8,280	7,612
Depreciation	841	720
Other items	4,327	3,692
<b>Operating deficit</b>	<b>1,033</b>	<b>1,244</b>

### Source and Application of Funds (US\$ 000) - Abridged

	<u>1995</u>	<u>1994</u>
<b>Sources</b>	<b>700</b>	<b>1,969</b>
Operating (deficit)/surplus after adjusting for non cash items	(192)	(504)
Increase in fund balances	867	442
Increase (decrease) in non cash net current liabilities	25	2,031
<b>Applications</b>	<b>1,039</b>	<b>965</b>
Additions to fixed assets	809	965
Cost of Centre Fund North American Office at Child Health Foundation Office	230	-
<b>(Decrease)/Increase in Funds</b>	<b>(339)</b>	<b>1,004</b>
<b>Cash and Deposits</b>		
January 1 1995	5,529	4,525
December 31 1995	5,190	5,529

Donors' Contributions (US\$ 000)

	<u>1995</u>	<u>1994</u>
<b>Revenue Contributions</b>	<b>12,115</b>	<b>10,468</b>
American Express Foundation via CHF	41	
Arab Gulf Fund	(150)	250
Australia - AusAID	311	299
Bangladesh	445	187
Belgium - BADC	391	341
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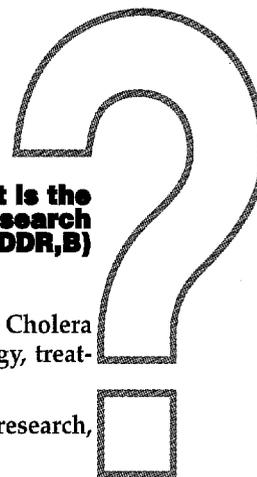
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*Patricia Vaughan*

*[Signature]*

## **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 Community Health Division**, composed of public health professionals, anthropologists, social scientists, economists and nutritionists, studies community-based approaches to improving health and reducing fertility. This Division is responsible for the Maternal and Child Health-Family Planning (MCH-FP) Project, which studies health service delivery systems in rural Matlab; the Centre's Environmental Health and Social and Behavioural Research Programme; and the Matlab Clinical Research Programme, which supports community-based research in reproductive and child health and offers treatment for diarrhoea to residents of the area.

**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 Population and Family Planning Division** includes the Demographic Surveillance System (DSS) which collects longitudinal data on a population of about 200,000 as a basis for a variety of health and family planning studies; the two (urban and rural) MCH-FP Extension Projects which undertake operations research and offer technical assistance to the Government of Bangladesh and Non-government Organizations in implementing the Centre's research findings; and the Population Studies Centre.

*Continued...*

**The Training Coordination Bureau** 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.

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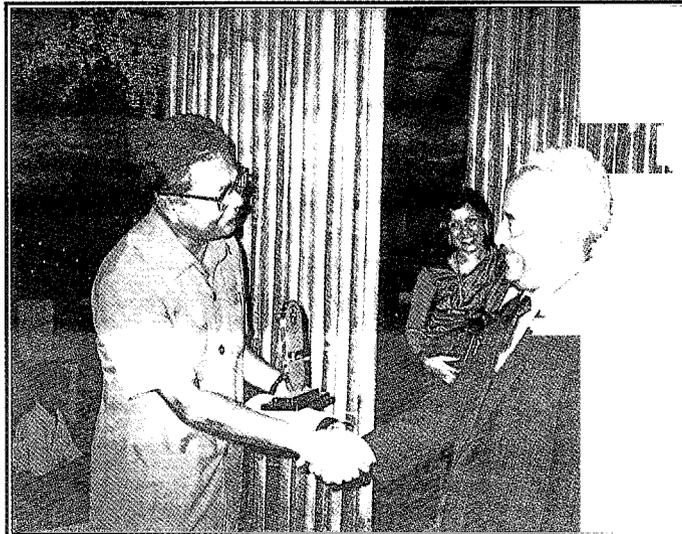
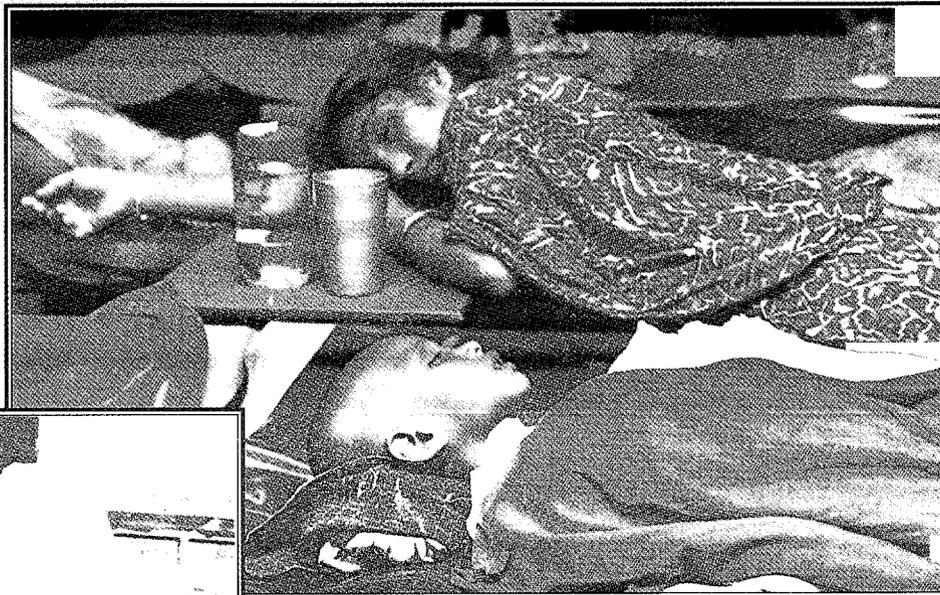
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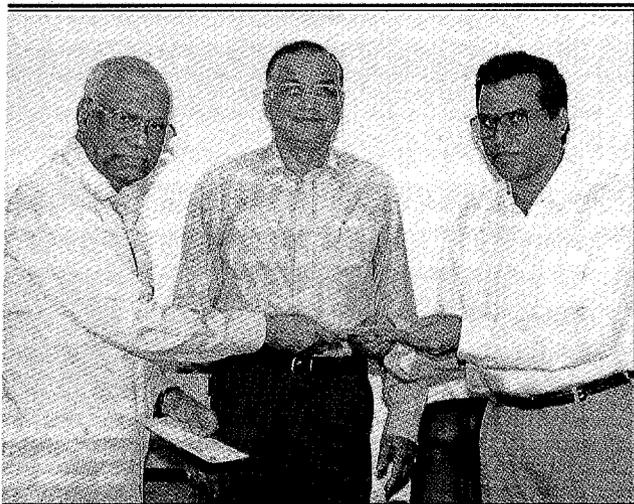


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The mother, or other  
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*Mr. Mujibur Rahman (right), Secretary of the ICDDR,B Employees' Cooperative Society, presents another cheque to Maj. Gen. (Retd.) M.R. Chowdhury (left), Chairman, and Mr. M.A. Mahub, Vice Chairman of the Hospital Endowment Committee.*

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